

THE ESTABLISHMENT
OF THE
HEAVY ELECTRICAL PLANT
AT BHOPAL

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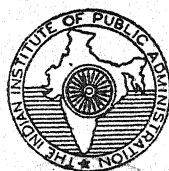
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S. S. KHERA



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PREFACE

THE OBJECTIVES of the Case Study Programme of the Indian Institute of Public Administration, which is being conducted under the sponsorship of the Committee on Case Studies, are manifold. The Programme marks the beginning of a continuing effort to promote a deeper and wider understanding, by the students, the administrators and the interested public, of the functioning of the Indian Administration in its environmental and institutional setting. The long-term aims are pedagogical, operational as well as scientific. The emphasis is on empirical and systematic study of the administrative process. It is my firm belief that such a study will help in building up sound hypotheses about Indian administrative practices and also open up, to the practitioners of administration in India, broader perspectives and deeper insights into the administrative process. Many of the administrators, as it is, never see clearly the entire setting, with its interplay of several forces, in which they make their recommendations and decisions. The compulsions of speedy disposal and heavy work do not always permit them to think of all the alternative choices which may be open to them or to base their decisions on adequate empirical data. Apart from their contribution towards building up a systematic body of knowledge about the Indian Administration and to its teaching at academic institutions, the Case Studies, it is hoped, will be found useful in different programmes of training of administrators.

The Case Study on "The Establishment of the Heavy Electrical Plant at Bhopal" published in this volume is a modest attempt to sketch in writing a slice of administrative life. The Case has been written within certain limitations inherent in the present stage of the Case Programme. An important limitation relates to the inability to interview all the personalities involved in the Case. Another major limitation has been the inability to portray the reactions and opinions of the individual administrators. These limitations arise from the principles of neutrality and anonymity of the Civil Service followed under

the Indian constitutional set-up.

The draft is tentative and comments as well as additional information from knowledgeable participants or readers will be welcome. While perfection in portraying the events as they happened in real life can never be achieved, criticism and additional material will obviously help in that direction.

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I owe a fund of gratitude to the Ministry of Commerce and Industry and the Ministry of Steel and Heavy Industries, Government of India, for making available all documents and records regarding this Case and for according permission to publish it. I am particularly indebted to Shri S. Ranganathan, Secretary, Ministry of Commerce and Industry, for his going through the manuscript at its early stages and for valuable suggestions. I also wish to thank Shri T. Swaminathan, Additional Secretary, Ministry of Steel and Heavy Industries, for scrutinizing the final draft.

I am equally thankful to Prof. V.K.N. Menon, Director of the Indian Institute of Public Administration, for continuing support and facilities extended by him to the Case Programme. The services rendered by Miss K.M. Shyamala, Assistant Research Officer of the Institute, in the preparation of this Case deserve special mention. She did commendable work in collating and analysing material and putting it in shape.

Thanks are also due to the Ford Foundation for its generous financial grant to the Institute for the Case Programme, and to Mr. Edwin A. Bock, Staff Director, U.S. Inter-University Case Program, for his help in organising and conducting a Case Workshop and Seminar in February last to impart training in the 'know-how' of Case preparation and writing.

S.S. KHERA

New Delhi
December 9, 1962

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INTRODUCTION

EARLY IN MARCH 1956, the Government of India took the decision to establish at Bhopal a factory for the manufacture of heavy electrical equipment including sizable quantities of generators, transformers, switch-gears, hydraulic turbines, traction equipment and other similar items. Bhopal, which is now the capital of the State of Madhya Pradesh, was in 1956 a Centrally administered area.

The decision was a sequel to a number of forces set in motion during the preceding decade, calculated to take the country towards self-sufficiency in basic industries, including heavy electrical equipment required for the power development programmes and heavy traction equipment for railway electrification.

Once the policy to make India self-sufficient in the field was clear, other processes and considerations followed. It was necessary first to decide whether the project should be in the public or private sector. The controversy regarding this issue was finally settled in 1954 with the decision by the Government to establish a state heavy electrical equipment factory with the collaboration of foreign firms.

The next question for consideration was the selection of technical Consultants to advise on the production programme and location of the project. The Consultants—the Associated Electrical Industries, a British firm—were chosen from among seven firms on the basis of the terms offered by them in regard to financial participation, fees for technical collaboration, etc.

The third question related to the selection of the most suitable site for the establishment of the heavy electrical equipment factory. Requests came from different States urging that the proposed plant should be located in their particular State. Various reasons—technical, economic and political—were put forward to justify the claim. After considering all the relevant factors, the Government of India decided ultimately to locate the factory at Bhopal, which was the second preference of the technical Consultants.

This Case Study traces the history of the establishment of the heavy electrical equipment plant at Bhopal, from the inception

of the idea in 1948 to the final decision to locate the plant at Bhopal in 1956. It deals with a long drawn-out decision-making process which may be split up into three separate but inter-connected decisions: (1) the decision to set up the plant in the public sector; (2) the decision to appoint the Associated Electrical Industries as the technical Consultants; and (3) the decision to locate the plant at Bhopal.

The story is pieced together largely from the Government records, parliamentary debates and newspaper items that appeared from time to time. The case is considered in isolation from the whole gamut of other administrative problems dealt by the Ministries concerned at the time. Several minor details have also been omitted so as to present the main issues involved in the proper perspective. It has not been possible to inform the reader about the varied and conflicting opinions on these matters discussed at the Union Cabinet level, and out of which the final decisions emerged. Just as in the U.K., political considerations at this level play an important part, but true to the parliamentary conventions India has imbibed from the U.K. proceedings of the Cabinet meetings are shrouded in secrecy. However, the final decision at each stage is an indication of the weight of opinion on it within the Cabinet itself.

* * *

The Ministry initially involved in the story was the Ministry of Industry and Supply, which first broached the question in 1948. But when the project was revived in 1952 it was taken up by the Ministry of Production, since in the meanwhile a reorganisation of Ministries had taken place resulting in the formation of the Ministry of Commerce and Industry out of the old Ministry of Industry and Supply and of a new Ministry of Production charged with the responsibility for all Central Government industrial undertakings except those allocated to other Ministries. The Ministry of Commerce and Industry dealt mainly with industrial development in the private sector. In the final stages of the location of the factory, a part of the Ministry of Production was amalgamated with the Ministry of Commerce and Industry and the H.E.E. project was registered in the name of the Ministry of Commerce and Industry under the Indian Companies Act, 1956.

The other Ministries intimately connected with the project were: the Ministry of Railways; the Ministry of Irrigation and Power; and the Ministry of Finance. Besides, the Planning Commission and the Central Water and Power Commission were closely associated with the project at all stages. Remotely interested parties were the Ministry of Home Affairs—in approaching the States, and the Ministry of Defence which was consulted for making requests and circulating questionnaires to the States.

The Union Cabinet set up special committees from time to time to consider the H.E.E. project.

Several foreign firms were also interested parties in the establishment of the H.E.E. factory. The Ministry of Production had listed 12 names of firms from the U.S.A., the U.K., Japan and Europe on the basis of the interest shown by them in the project.

Also interested in the scheme were the State Governments of Andhra Pradesh, Bihar, Bhopal, Bombay, Hyderabad, Madhya Bharat, Madhya Pradesh, Madras, Mysore, Orissa, Travancore-Cochin, Uttar Pradesh, Vindhya Pradesh and West Bengal. These strongly pressed for the location of the factory in their respective States.

Prior to the decision to have the plant located in the public sector, the private industry in the country also evinced keen interest in the matter. Representations were received from the Director of the Power Plant Industry, Madras, and the Indian Electrical Manufacturers Association.

Parliament was content with seeking information and left it to the Executive to decide the issues on merits. Questions were put to the Minister of Production in August 1953, April 1954, March 1955 and February 1956. Brief discussions also took place during the debate on the General budget—Demand for Grants for the Ministry of Production—in June 1952 and April 1954.

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It is a well established convention in the Government of India today that all important decisions about formulation of projects involving technical considerations and substantial amount of capital investment should be taken only after expert committees

have thoroughly assessed the situation and scrutinised the issues involved. The head of the Division dealing with the subject in the Planning Commission is invariably associated with such committees. After a Central project has been technically approved, it is discussed in a number of meetings between the Planning Commission and Administrative Ministries. The final position emerging from these discussions is presented for the approval of the Cabinet in a formal note. The Cabinet may consider the proposals as a whole body or in a special committee appointed for the purpose. Its sanction is essential for the inclusion of the scheme in the annual budget of any particular year of the Ministry concerned.

The expert committees set up to help in taking of decisions dealt with in this Case Study were: the Exploratory Committee (1948); the Heavy Electrical Equipment Committee (1954-55); the Negotiating Committee and the Electrical Experts Committee (1955).

The committee device has been used increasingly in recent years for another important purpose—to speed up decision-making. It was found that the formal procedure of inter-Ministry consultations through the movement of the files of formal communications was a long and cumbersome process. A project proposed by a Ministry had to receive the sanction of the Ministry of Finance and other Administrative Ministries interested in it. This at times led to protracted and unfruitful consultations, resulting in delays. By means of a committee, Ministries connected with a project are brought together at a meeting and the decision taken therein is presented to the Cabinet for its approval, by the Ministry administratively responsible for the project.

THE BACKGROUND

GOVERNMENT POLICY REGARDING DEVELOPMENT AND LOCATION OF INDUSTRIES

TILL THE FIRST WORLD WAR the industrial policy of the Government of India was one of *laissez faire*. During the war considerations of defence prompted the Government to establish state factories to produce arms and ammunitions and other defence equipment. The Industrial Commission (1916-18) envisaged an active role for the State in promoting and assisting industrial development but it did not favour the undertaking of industrial operations on a commercial scale by the Government itself except in exceptional circumstances. With the introduction of Montagu-Chelmsford Reforms under the Government of India Act, 1919 "development of industries" (except where development under Central control was declared by Central law to be expedient in the public interest or essential for the purpose of defence or war) became a provincial subject¹ and the Government of India therefore lost direct interest in industrial development. The *laissez faire* attitude of the Government was modified after the war by the adoption of a policy of discriminating protection. The inter-war period witnessed an upsurge of nationalism. It was only during the Second World War that the Government began increasingly to recognise the necessity of helping industrialisation in the country through direct State participation in new industries. The schemes for post-war reconstruction prepared towards the end of the Second World War were based on the premise of an active and positive role of the State in industrial development.

The Industrial Policy Statement of 1945

A Planning and Development Department was set up by the Government in 1944. Realising that the general economic policy pursued by the Government of India under its constitutional powers exercised a profound influence over industrial development

1. This, however, did not affect the fiscal policy of the Central Government in regard to industries.

and that the programme of planning necessitated taking over certain industries under Central control in the interest of co-ordinated development, the Planning and Development Department issued a Statement on Industrial Policy in April 1945. It was the first attempt of its kind to formulate a clear-cut policy regarding the respective roles of the State and the private enterprise in the future industrial development of the country.

The 1945 Statement indicated that the Government had decided to take positive steps to encourage and promote rapid industrialisation of the country to the fullest extent possible with a view to making the country better prepared for defence, increasing the natural wealth by the maximum utilisation of the country's resources and providing a high and stable level of employment. For achieving these objectives, the Statement listed 20 industries to be taken over under the Central control. It further pointed out that ordnance factories, public utilities and railways, which were already very largely State-owned and State-operated, should be continued and in accordance with the decision taken by the Government the bulk generation of electric power should as far as possible be a state concern. Furthermore, basic industries of national importance might be nationalised, provided adequate private capital was not forthcoming and it was considered essential to promote them in the national interest. These basic industries were to include aircraft, automobiles and tractors, chemicals and dyes, iron and steel, prime movers, transport vehicles, electrical machinery, machine tools, electro-chemical and non-ferrous metal industries. Government might also take over certain industries (e.g. salt manufacture) in which the tax element was more predominant than the profit element and it was necessary and convenient for the State to do so. The Statement added that certain industries of national importance such as ship-building and the manufacture of locomotives and boilers should be run by the State as well as by the private enterprise. Within the field earmarked for state enterprise, the question whether the existing private units should be taken over by the State was to be examined on the merits of each case.

Pointing out that one effect of the unregulated freedom enjoyed by the private sector to promote industrial enterprise had been the concentration of industry in certain areas which was

unsound from economic, social and strategic points of view, the Statement explained that "it would in many cases be found in the long run, both socially and economically, cheaper to disperse industry, if regard is paid to the benefits of a widely spread industrial structure and its integration with agriculture." It noted that the Government had decided to take power to license industrial undertakings to regulate industrial development and promote regionalisation of industry.

* * *

The Planning and Development Department was abolished in 1946 and its functions were transferred to the Department of Industries and Supplies and to the Co-ordinating Committee of the Cabinet. In 1946, an Advisory Planning Board was appointed to survey the planning already undertaken and make recommendations regarding the future machinery for planning and the objectives and priorities of planned development of the country. Its report, submitted in February 1947, suggested that as far as possible there should be a certain degree of regionalisation, i.e., a dispersal of industries and other economic activity, so that each distinct region of the country would develop a balanced economy. It emphasised that Central planning of large scale industries seemed to be essential for conservation of capital resources, avoiding wasteful competition and securing regional development which would advance the standard of living in the country as a whole and avoid undue concentration of industries in particular areas. Twenty-one industries were specified for this purpose; these were, in most respects, the same as mentioned in the Statement of April 1945. It was further recommended that apart from defence industries and industries which it might be desirable to start as state enterprise because of the reluctance of the private enterprise to undertake them, coal, mineral oils, iron and steel, motor, air and river transport should be nationalised.

The Economic Policy of the Indian National Congress

The economic policy of the Indian National Congress, that came into power in 1947, was vaguely enunciated in the earlier period of its fight for freedom. It generally favoured the protection and

growth of 'indigenous' industries. In 1931, a resolution passed at the annual session of the Congress held at Karachi, as revised by the All-India Congress Committee, recommended that the State should "own or control" key industries and essential services, mineral resources, railways, waterways, shipping and other means of public transport. This was reiterated in the 1945 Election Manifesto of the Congress. The Manifesto also stated that industry should not be concentrated in particular provinces and should be decentralised as far as it was possible without sacrifice of efficiency. These ideas were latter worked out in detail in the reports of the National Planning Committee under the direction of Shri Jawaharlal Nehru.

The Industries Conference convened in December 1947, in the wake of increase in industrial strife and decline in production, emphasised the need for a clear-cut demarcation between the roles of the private and public enterprise in the field of industrialisation. The first attempt to evolve a definite long-term economic policy was made by the Economic Programme Committee of the Indian National Congress in January 1948. The Committee, which had Prime Minister Nehru as its Chairman, recommended that new undertakings in defence, key public industries and also undertakings monopolistic in character should be started under public ownership and that the existing private undertakings in this sphere should be gradually taken over after an initial period of five years, although this was to be subject to the limit of the State's resources and capacity at the time. The Committee suggested that regional self-sufficiency should be the aim with regard to all types of industries. It, however, felt that it would not be desirable to erect physical barriers in respect of movement of goods in the interest of regional development, that fiscal and other measures should therefore be adopted to foster suitable industries in different regions, and that such measures would be particularly appropriate for the industrial development of backward areas. It also proposed the abolition of the managing agency system, measures for the limitation of profits and division of the surplus profits between the workers and the shareholders. The Committee's recommendations created serious apprehensions in the minds of the industrialists. This led to a clear announcement of its policy by the Government on April 30, 1948.

The Industrial Policy Resolution of 1948

The Resolution of 1948 emphasised the importance to the economy of securing a continuous increase in production and its equitable distribution. It pointed out that the State should play a progressively active role in the development of industries; however, the ability to achieve this objective would determine the immediate extent of State responsibility and the limits to private enterprise. The Resolution laid down that besides arms and ammunition, atomic energy and railway transport (category one) which would be the monopoly of the Central Government, the State would be exclusively responsible for the establishment of new undertakings in six basic industries (except where, in the national interest, the State itself found it necessary to secure the co-operation of private enterprise). These six industries (category two) were coal, iron and steel, aircraft manufacture, shipbuilding, manufacture of telegraphs, telephone and wireless apparatus and mineral oils. The existing undertakings, however, would be allowed to continue for 10 years, with facilities for efficient working and reasonable expansion. At the end of this period the whole matter would be reviewed. If it were then decided that the State should acquire any unit, the fundamental rights guaranteed by the Constitution would be observed and compensation awarded on a fair and equitable basis.

The Resolution further mentioned an illustrative list of industries (category three) which would be subject to Central regulation and control, as their location had to be governed by economic factors of all-India import, or because they required considerable investment or a high degree of technical skill. The industries falling in this group would include: salt, automobiles and tractors, prime movers, electrical engineering, other heavy machinery, machine tools, heavy chemicals, fertilizers and pharmaceuticals and drugs, electro-chemical industries, non-ferrous metals, rubber manufactures, power and industrial alcohol, cotton and woollen textiles, cement, sugar, paper and newsprint, air and sea transport, minerals, and industries related to defence.

The rest of the field was to be left open to the private sector, individual as well as co-operative, though the State would also progressively participate in it and intervene whenever the progress of an industry was unsatisfactory.

The Industries (Development and Regulation) Act, 1951

In pursuance of the policy announced in 1948, the Industries (Development and Regulation) Act was enacted in 1951 to provide for regulation and development of certain industries and group of industries specified in the First Schedule to the Act. It laid down that all existing undertakings in the Scheduled industries,² unless exempted under the provisions of the Act, would be registered with the Government within a prescribed period and that no new unit would be established or substantial extensions of the existing plant made without a licence from the Central Government. In granting the licence to new undertakings the Government could impose conditions as to the location of the undertaking. Provision was also made for ordering investigations into the affairs of any Scheduled industrial undertaking or industry in case of mismanagement and for purposes of conserving resources of national importance; and for taking over its management by Government if the industry or undertaking did not carry out the directions issued by the Government after such an investigation.

For the purpose of advising the Government on matters concerning the development and regulation of the Scheduled industries, the Act provided for setting up a Central Advisory Council of Industries, having representation of owners, employees, consumers, and certain other classes including primary producers. Further, the Act empowered the Government to set up Development Councils for any individual or groups of industries. The machinery of Development Councils was expected to provide a continuous liaison between the private sector and Government and help in formulating programmes of development in conformity with the means of the industry concerned and the overall pattern laid down in the Government policy and the Five Year Plan. (A Development Council for the heavy electrical industry was set up in 1955-56.)

The First Five Year Plan

The First Five Year Plan (1951-56) was formulated within the framework of Government policy enunciated in the Industrial

2. These included industries producing machinery and equipment for the generation, transmission and distribution of electric energy, electric motors, batteries and electrical goods.

Policy Resolution of 1948. The Plan emphasised that the distinction between the public and the private sectors was one of relative emphasis; there was no such thing under the prevailing conditions as completely unregulated and free private enterprise and any major extension of private enterprise could rarely be undertaken except through the assistance of the State in one form or another. The points of interaction between the private and public sectors were multiplying rapidly; they could no longer be looked upon as anything like two separate entities and they must function as parts of a single organism.

The First Five Year Plan pointed out that industrial development in India had been concentrated in a few select areas, and had lagged behind seriously in some parts of the country. It observed: "If industrial development in the country is to proceed rapidly and in a balanced manner, increasingly greater attention will have to be paid to the development of those States and regions which have so far remained backward. Under the Industries (Development and Regulation) Act, the Government has powers to regulate locations. The extent to which the pattern of industrial location in the country can be changed within a short period is undoubtedly limited."

* * *

A resolution on Economic Programme adopted by the Indian National Congress in October 1951 at Delhi stated that "the Congress stands for the progressive extension of the public sector according to the resources and personnel available. For the present, however, the bulk of the resources available to the State have to be invested as a matter of priority in agriculture, irrigation and power, transport and cottage and small scale industries."

After 1953, there was a shift in thinking within the Indian National Congress, towards increased ideological emphasis on social justice, reduction in disparities of income and wealth, more equitable distribution and a socialised economy. This implied a greater accent on the public sector. The All-India Congress Committee in a resolution adopted at Ajmer in July 1954 suggested that the public sector should be enlarged by the addition of other basic and new industries wherever possible, and

that where social ownership of basic industries was not possible in the near future, effective social control should be exercised. It added that the existing private industries should, however, not be nationalised except when necessary in the national interest. In December 1954 a resolution was adopted by the Lok Sabha (the House of the People) which *inter alia* stated that the objective of economic policy should be a socialistic pattern of society. At its annual session held in January 1955 at Avadi (Madras), the Indian National Congress resolved that "planning should take place with a view to the establishment of socialistic pattern of society where the principal means of production are under social ownership or control, production is progressively speeded up and there is equitable distribution of the national wealth."

Memorandum on Industrial Policy, 1954

In mid-December 1954, the Government circulated for information of Members of Parliament a Memorandum setting out the progress made and the special problems arising in the implementation of the Industrial Policy as enunciated in the Resolution of 1948. This Memorandum reiterated that in the mixed economy postulated by the Industrial Policy Resolution of 1948 there was no real conflict of interests between the public and private sectors and their respective roles must be determined by the contribution that each could effectively make for a rapid development of the country's industries. The reservation for the public sector of certain basic industries vital to the economic life of the country and to a certain extent its security did not in any way mean that the private sector would not be asked to co-operate or foreign interests not allowed to participate in them so long as it was clear that the controlling interest was held by the State. A large part of the industrial field still continued to be open to the private enterprise and initiative and it was Government's policy to encourage and assist such enterprise.

The Memorandum further pointed out:

"The object of industrialisation is to provide for the needs of the people and to offer increasing opportunity for employment. These opportunities should be available to people in all regions of the country. At the same time, industries can only grow or be

established in areas which are economically suitable having regard to the availability for raw materials, fuel, power and transport. In pursuance of the Policy Statement of 1948, industries whose location must be governed by economic factors of all-India import, or which require considerable investment or a high degree of technical skill, have been subjected to Central planning and regulation under the Industries (Development and Regulation) Act. These economic factors cannot be ignored if wasting of resources and burdens on the national economy are to be avoided. National resources like ores or coal or forests have to be exploited where they occur. But by the provision of transport and power in areas which have hitherto remained backward, it is possible to secure as wide a dispersal of industries as possible."

The Industrial Policy Resolution of 1956

A fresh statement of industrial policy, necessitated by the adoption of the new Constitution incorporating the Directive Principles of State Policy and the acceptance in December 1954 by Parliament of a socialistic pattern of society as the national objective, was announced on April 30, 1956. The Industrial Policy Resolution of 1956 pointed out that "The adoption of the socialistic pattern of society as the national objective as well as need for planned and rapid development require that all industries of basic and strategic importance or in the nature of public utility services should be in the public sector. Other industries which are essential and require investment on a scale which only the State, in the present circumstances, could provide have also to be in the public sector."

Under the 1956 Resolution industries were classified into three categories as follows, having regard to the role which the state would play in each of them:

Category One consisting of industries the future development of which would be the exclusive responsibility of the State. All new units in these industries would be set up only by the State. This would not, however, preclude the expansion of existing private units or the possibility of the State securing the

co-operation of private enterprise. This category included industries like arms and ammunition and defence equipment, iron and steel, heavy castings and forgings, heavy electrical plants, coal, mineral oils, important metals, aircraft, shipbuilding, etc.

Category Two comprising industries—mentioned in Schedule B to the Resolution—which would be progressively State-owned and in which the State would therefore generally take the initiative, specially in developing new undertakings, but in which private enterprise would also be expected to supplement the State effort, e.g., machine tools, ferro-alloys, antibiotics and other essential drugs, fertilizers, road and sea transport, etc.

Category Three covering all the remaining industries whose future development generally would be left to the private sector; but it would, however, be open to the State to start any industry even in this category.

It was clarified that these categories would inevitably overlap to some extent but it was not the intention to make them into water-tight compartments. The 1948 Resolution included only arms and ammunition, atomic energy and rail transportation under State monopoly; the 1956 Resolution added 14 other industries to this category, with the provision that the existing privately owned units might be allowed to expand.³

Regarding the location of industries the Resolution noted:

“In order that industrialisation may benefit the economy of the country as a whole, it is important that disparities in levels of development between different regions should be progressively reduced. The lack of industries in different parts of the country is very often determined by factors such as the availability of the necessary raw materials or other natural resources. A concentration of industries in

3. The element of flexibility in the Government's Industrial Policy is evident from the fact that it has allowed, during the period of the Second and Third Five Year Plans, expansion of iron and steel, petroleum, zinc and coal in the private sector, notwithstanding that these are, under the Industrial Policy Resolution of 1956, included in industries (listed in Schedule A) the development of which is the exclusive responsibility of the State.

certain areas has also been due to the ready availability of power, water supply and transport facilities which have been developed there. It is one of the aims of national planning to ensure that these facilities are steadily made available to areas which are at present lagging behind industrially or where there is greater need for providing opportunities for employment, provided the location is otherwise suitable. Only by securing balanced and co-ordinated development of the industrial and the agricultural economy in each region, can the entire country attain higher standards of living."

The Second Five Year Plan

The Second Five Year Plan (1956-61) accorded a high priority to rapid industrialisation with particular emphasis on the development of basic and heavy industries, within the framework of the new Industrial Policy Resolution. It emphasised that in any comprehensive plan of development it was axiomatic that the special needs of the less developed areas should receive due attention. The Second Plan further drew attention to the following recommendation made by the National Development Council:

"In the location of new enterprises, whether public or private, consideration should be given to the need for developing a balanced economy for different parts of the country. Some industries have to be located in particular areas in view of the availability of the necessary raw materials or other natural resources. But, there are other industries in regard to the location of which, on economic considerations, there is a field of choice. Often, the disadvantages of comparative cost are only a reflection of the lack of basic development. Once this is taken in hand the initial handicaps progressively disappear. A wide diffusion of development nuclei is essential from this point of view."

The Second Plan recommended that:

"These approaches, which have been stressed also in the new Industrial Policy Resolution, have to be kept in

view while programming development in the public sector as also in the administration of licensing policy for new industrial units in the private sector."

In drawing up and implementing the Second Plan, the regional aspects of development were taken care of in three different ways: (1) Emphasis was placed in the State Plans on programmes having a direct bearing on the welfare of the people in different parts of the country. (2) Special programmes were undertaken in particular areas where development had either received a temporary setback, or was being held back by certain basic deficiencies. (3) Steps were taken to secure more dispersed development of industry which, in turn, created conditions for development in several related fields.

The Third Five Year Plan

One of the principal aims of the Third Five Year Plan (1961-66) is to expand basic industries like steel, chemicals, fuel and power and establish machine-building capacity, so that the requirements of further industrialisation can be met within a period of ten years or so mainly from the country's own resources. The Third Plan notes:

"While, in the selection of sites for basic capital and producer goods industries, proximity to raw material and other economic considerations have naturally been important, it was felt that in a wide range of consumer goods and processing industries it was possible to foster regional patterns of development. "...for basic industries location has generally to be based on technical and economic considerations. Moreover, in the case of industries which may be able to export a significant proportion of their output, in the national interest the location of new or additional capacity has to be guided by the need to secure economies of scale and to enhance the ability to compete in foreign markets. But, subject to these broad considerations, the needs of areas which have the necessary potential for industrial development should be kept in view in the selection of sites for industrial projects, both in the public and the private sectors. The general approach has to be to avoid

further concentration of industrial activity in areas where considerable development has already taken place or has been planned, but expansion in existing industries in such areas cannot, of course, be ruled out if it leads to greater economies in production. Similarly, as far as possible, care must be taken to set up new industries away from large and congested cities.

“In the licensing of industrial projects in the private sector also, the claims of under-developed regions are kept in view and locations in such areas are suggested to prospective industrialists. The progress, programmes and production targets of a number of industries in the private sector are examined from time to time with a view to securing the location of new capacity on a zonal basis. It is recognised that in future there should be even greater stress in these directions.”

PART ONE

THE CHOICE OF THE PUBLIC SECTOR

THE INITIAL PROPOSALS: 1947-50

The Origins

THE IDEA OF the establishment of a heavy electrical equipment factory was first mooted by the Advisory Planning Board¹ set up in October 1946 by the interim Government of India to review the planning that had already been undertaken in the country, suggest ways of effecting improvement and co-ordination in planning, indicate objectives and priorities, and make recommendations as regards the future machinery for planning. The Board submitted its report to Government in February 1947, and this report, among others, suggested for the first time the possibility of developing electrical machinery industry in India. It was listed along with 20 other industries such as coal, iron and steel, machine tools and the like, to be considered suitable for centralised planning. The country was then in the midst of a post-war inflationary crisis; hence no action was immediately taken on the recommendation.

The question was revived by the Technical Committee on Engineering Industries of the Industries Conference, convened in December 1947 by the Ministry of Industry and Supply to advise and help the Government of India in devising measures for increasing production and evolving an industrial policy. The Committee recommended the establishment of a State-owned heavy electrical equipment factory in India. The matter was further considered by the Ministry of Industry and Supply and it was decided to appoint a committee to explore the possibility of developing the manufacture of heavy electrical equipment required for the generation, transmission and consumption of electric power in the country.

1. The members of the Board included statesmen, high Government officials, scientists and economists.

The Exploratory Committee of 1948

The Exploratory Committee, which was appointed early in 1948, had Dr. J.C. Ghosh, Director-General of Industries and Supplies, as its chairman, and as two other members, Shri S.N. Mozumdar, Chairman of the Damodar Valley Corporation, and Shri A.N. Khosla, Chairman of the Central Water-Power Irrigation and Navigation Commission. The Committee met in March 1948, and recommended that as heavy electrical (generating) equipment constituted a key industry and the Government would be the main purchaser of its products, a factory for its manufacture should be set up in the *public sector* immediately. It further suggested that the Government should establish the factory in collaboration with foreign manufacturers of world repute.

The report of the Committee laid special emphasis on the urgency of establishing such a factory. It noted:

“No country which wishes to develop its industrial potential can afford to be wholly dependent on other countries for supplying its requirements of basic electrical power plant. India's large plans for the development of the hydro-electrical and river valley projects depend entirely on foreign countries for their basic plant. This is a lamentable position to be in, as it puts the power supply industry in jeopardy in times of war.

“Even if the factory should run at some loss for a few years, the Central and State Governments who will be the main consumers of its products should be prepared to subsidise the industry in the initial stages. Such a subsidy will be justified as this industry is essential for the economic well-being of the country. Japan established this industry in co-operation with Westinghouse and International General Electric Co. two decades back. In Europe even small countries like Switzerland, Czechoslovakia, Italy and Sweden manufacture heavy power plant for their use and export.”

Acting along the lines suggested by the Committee, the Director-General of Industries and Supplies invited well-known foreign firms from the U.S.A., the U.K., and the continent of

Europe for collaboration in the establishment of a heavy electrical equipment factory. Six firms expressed their willingness to collaborate in the scheme and all of them sent their senior officers to discuss their offers and negotiate terms with the Government of India in the Ministry of Industry and Supply.

The proposals made by each of these firms were scrutinised by the Exploratory Committee and detailed discussions were held with the representatives of the firms in September 1948. The Committee then made the following recommendations to the Ministry of Industry and Supply:

- (1) The Government should enter into negotiations with Firm X of U.S.A. with a view to linking up with them; and
- (2) If it was not possible to do so, the offer of the Associated Electrical Industries of the U.K. should be considered.

Recognising the necessity and urgency of establishing a state-owned heavy electrical power plant factory in India, the Ministry of Industry and Supply decided to invite the two firms recommended by the Exploratory Committee to submit detailed project reports on the basis of which Government could adopt measures to implement the scheme.

Project Reports by Foreign Firms

The Ministry of Industry and Supply entered into agreements on 17th and 22nd January, 1949 with the A.E.I. and Firm X respectively for the submission of project reports. Several months afterwards in July 1949, Firm Y of U.S.A. also evinced keen interest in the project. It offered to submit to the Government a similar project report free of cost. This offer was accepted by the Government.

Extensive surveys were carried out by the experts of the three firms and on the basis of these surveys they submitted their project reports to the Ministry of Industry and Supply towards the end of 1949. In the preparation of the reports the firms were guided by the detailed list of power plant requirements prepared by the Exploratory Committee.

The project reports covered a scheme for the production of heavy power plant of the aggregate capacity of 300,000 KW per year, which was in keeping with the detailed list given to the

firms by the Committee. The project report of the A.E.I., besides, made provision for the production of small electrical motors and other equipment termed as "bread and butter business". This company already had in existence, in Calcutta, a factory producing some of these items of small equipment and it offered to sell the factory to the Government as a part of its proposal.

The project reports showed divergencies regarding the strength of personnel required, their salaries and wages, cost of raw materials, range of items of equipment to be manufactured and the net sales value of the output of the factory. (For details, please see Appendix I.) Hence, discussions were held with the representatives of the firms for further clarification on all these counts. These discussions failed to bring about any changes in the offers made by the A.E.I. and Firm X, but Firm Y revised somewhat the original estimates of the cost of raw materials.

*Proposals for the Manufacture of Power Plant of
175,000—300,000 KW per Year*

After a careful consideration of the manufacturing programmes and the country's requirements of heavy power plant during the next several years, the Exploratory Committee came to the conclusion that for various reasons it would be best to arrange in the first instance for the manufacture of 175,000 KW of power plant a year, and gradually develop it to 300,000 KW of power plant annually. The Central Electricity Commission, which was consulted in the matter, confirmed that such a production target would just suffice to meet the country's requirements of hydro-electric equipment needed for the projects in the programmes of the States and the Union. The Exploratory Committee estimated that the establishment of a factory for the manufacture of 175,000 KW of power plant a year would in itself effect a saving in foreign exchange to the tune of Rs. 5 crores annually, while the project including working capital but excluding provision for housing and other related expenditure would cost about Rs. 22 crores.

Of the three firms, who had submitted project reports at that time, only Firm Y had shown a willingness to participate financially in the project. Such participation, it was indicated, could be in the form of a loan spread over a number of years

to cover the overseas expenditure, including the dollar component, together with some permanent investments in the factory. Later on, Firm Y offered also the services of its affiliated company, Firm Z₁ for the erection and technical management of the factory for an initial period of ten years. The Exploratory Committee recommended in early 1950 that the erection of the plant should be entrusted to Firm Y, and suggested that further negotiations should be undertaken to settle questions of financial participation and other matters.

The Recommendations of the Exploratory Committee

The detailed recommendations of the Committee in brief were as follows:

- (1) Government should select Firm Y as the collaborating firm.
- (2) The manufacturing programme should be as given in stages I and II detailed in the project report submitted by Firm Y, that is manufacture of 175,000 KW of power plant a year; but in locating the factory and making other arrangements, the ultimate development of the concern, as envisaged in the report of Firm Y, should be kept in mind.
- (3) Construction of the factory and supervision over manufacturing operations for the first ten years should be entrusted to Firm Z₁.
- (4) A Board, composed primarily of engineers, should be set up at once to implement the decision of the Government in this regard.
- (5) Provision should be made for a capital of Rs. 13.82 crores for the capital outlay of the factory plus Rs. 6.07 crores for the housing estate (for workers), spread over a period of six years. In addition, arrangements should be made for working capital of about Rs. 8.55 crores.

The Project is Deferred

Further consideration of the project in the Ministry of Industry and Supply was, however, deferred on account of the prevailing financial stringency. There was a heavy drain on the foreign exchange requirements and the projects that were already under construction deserved priority. The country was faced with

a food crisis which claimed priority in the distribution of the limited financial resources. Because of these considerations it was decided to postpone the establishment of the heavy electrical equipment factory for the time being.

THE REVIVAL OF THE SCHEME : 1952-53

The Industrial Policy Resolution of 1948

At the time the proposal to establish a heavy electrical equipment factory was initially made in 1947, the industrial policy of the Union Government was still in a formative stage. When the national industrial policy was announced in 1948 by the new Government of independent India, electric engineering and heavy machinery were classified, along with some other industries, under category three, i.e., those subject to regulation and control by Government. The Resolution on Industrial Policy of April 1948, while clearly stating that the State would in future play a progressively active role in the development of industries, also said that it would for the time being confine itself to expanding the projects already under its control and starting new units of production rather than nationalising the existing units in the private sector.

The inadequacies of industrial development within the country were manifest by 1950, but the particular inadequacies became more noticeable after the launching of the First Five Year Plan. Several hydro-electric power projects were planned for development in the next five years and electrification of railways was also expanding. A conservative estimate made at the time showed that the demand for heavy electrical power plant was bound to increase further at the end of the First Five Year Plan. Besides, the Exploratory Committee had stated in 1948 that the establishment of a H.E.E. plant would save foreign exchange to the extent of Rs. 5 crores annually. The amount was bound to be larger in 1952. In view of these changes, the need for a heavy electrical equipment factory became all the more urgent. Moreover, the cost of the project, as estimated by Firm Y, was roughly Rs. 28 crores. It was estimated in 1953 that the same project would cost Rs. 32 crores at the prevailing level of prices. It was, therefore, felt that in view of the magnitude of the financial commitment involved, private enterprise would

not venture into the field. Above all, this being a key industry, there was a strong case for its establishment in the country as a state enterprise.

The question of establishing a H.E.E. factory was raised in the Lok Sabha (The House of the People) on 18th June, 1952. Speaking on private capital participation in Government undertakings, during the debate on the General Budget—Demand for Grants, Ministry of Production—Shri G.R. Damodaran, (Congress) said :

“I would like to suggest that Government also take into consideration the starting of a factory to make Heavy Electrical Equipment for our expansion and development programmes. Electrical equipment like turbo-generators, alternators, etc. will be needed in large quantities.

“For a factory to manufacture these, we need of course help and assistance from abroad, from the progressive countries of the west like America. But a factory of this type will be helpful in developing the electrical industry in our country and at the same time supplying the huge quantity of machinery and equipment that is needed for the rehabilitation and reconditioning of our power generating stations which are going to be numerous in our country.”

The question was taken up again in 1952, by the newly constituted Ministry of Production, which was set up in May 1952. This new Ministry was responsible for all Central Government industrial undertakings, except those allocated to any other Ministry of the Government of India. A recent re-organisation of Ministries had converted the former Ministry of Industry and Supply into the Ministry of Commerce and Industry, charged with the responsibility of the regulation of industry in the private sector. As a first step towards the revival of the scheme, the Ministry of Production submitted a proposal to the Planning Commission for the inclusion of the project, as envisaged in 1949, in the First Five Year Plan. It also suggested that, to begin with, a sum of Rs. 10 crores should be earmarked for the project.

Inclusion in the First Five Year Plan

The Planning Commission considered the proposal and, after holding detailed discussions with the representatives of the

Ministry in November and December 1952, included the project in the First Five Year Plan. It signified its intention to provide a sum of Rs. 7 crores for it out of a lump sum provision of Rs. 50 crores for basic industries and transport. This amount fell short by Rs. 3 crores of the amount requested by the Ministry of Production to cover the preliminary expenses of the project.

Having accomplished this, the Ministry of Production sent out feelers to find out if Firm Y would still be interested in the project. The Secretary, Ministry of Works, Housing and Supply, Government of India, who had been deputed along with some other officials to the U.S.A. to negotiate with the World Bank and other foreign parties for putting up a blast furnace in India, had informal discussions with the representatives of Firm Y. He informed the Ministry that Firm Y appeared to be still interested in the project, though not to the same extent as in 1949, and was willing to help the Government of India in the erection of the factory with such technical assistance as might be necessary. It would also be prepared to participate in the capital investment necessary for the project but not to the same extent as originally expected. The delegation had further learnt that Firm Y would persuade its associates, Firm Z, a French concern, and other associates, to take up the entire foreign exchange component of the cost of the scheme, which was estimated at 50% of the total cost.

The Inter-Ministry Meeting (January 2, 1953)

The Ministry of Production then convened a meeting of the representatives of the Planning Commission and the Ministries of Commerce and Industry (Development Wing) and Finance, etc. on January 2, 1953. Present at this meeting were: Shri A.K. Chanda, Secretary, Production; Shri C.C. Desai, Secretary, Works, Housing and Supply; Shri K.R.P. Iyengar, Joint Secretary, Ministry of Finance (Industry and Commerce Division); Shri E.P. Moon, Adviser, Planning Commission; Shri Jangbir Singh, Industrial Adviser, Development Wing, Ministry of Commerce and Industry; and Shri P.M. Nayak, Deputy Secretary, and Shri S.K. Guha, Under Secretary, Ministry of Production. The meeting decided that the first step for the revival of the project would be to approach foreign firms of international repute to ascertain if any of them would be interested in

providing the technical and financial participation necessary for the establishment of the factory. It was felt that in case the offers received from other firms were not more favourable than those of Firm Y, steps should be taken to conclude an agreement with the latter. Besides, it would be necessary to make a small budget provision of Rs. 10 lakhs in the budget of the Ministry of Production for the year 1953-54 to cover the preliminary expenditure on the project. The Ministry of Production accordingly submitted a note to the Cabinet, with a request that the project should be included in the programme of the Ministry for the year 1953-54.

The Ministry of Commerce and Industry Differs

The appropriate committee of the Cabinet, which considered the proposal, however, deferred action on it to take into account the recommendations of the Ministry of Commerce and Industry which had pointed out that it had not been consulted by the Ministry of Production in laying the proposals for the approval of the Cabinet. In a note submitted in the first week of January 1953 to the Cabinet the Ministry of Commerce and Industry explained that it did not agree with the view that the scheme, as originally proposed, was still necessary for the country. It was of the view that the Ministry of Production had not sufficiently taken into consideration the developments in the field of electrical goods manufacture in the country during the previous three years. It was the considered opinion of the Ministry of Commerce and Industry that a realistic assessment of these developments would necessitate a drastic curtailment of the scheme as originally envisaged. Therefore, the first step in the revival of the scheme should be to make an assessment of the needs of the country rather than to secure foreign collaboration. The Ministry of Commerce and Industry quoted the earlier reports of the three firms to prove that a project to manufacture heavy electrical equipment plant of 300,000 KW per annum, as planned in 1949, would not be economical. Firm Y had, in its project report, planned for the development of the project in three stages, and on completion of the first stage, over a seven-year period, the project was expected to provide for the production of equipment of 175,000 KW a year.

It was true that at that time, in 1949, the Central Electricity

Commission had also agreed that this target would be sufficient to meet the requirements of the hydro-electric projects for the programmes of the States and Centre taken together. But the Ministry of Commerce and Industry argued that, as some of these programmes had been abandoned, while some other had made considerable headway, the establishment of the plant, as originally planned, would not serve much purpose, especially as most of the schemes under way would be completed by the time such a factory could reach production level. A new factory should, therefore, be set up only after making a fresh assessment which would take into consideration the likely demand in the field after five years when the factory would be expected to go into production.

The Ministry of Commerce and Industry substantiated its point of view by drawing attention to the developments that had taken place in the field of electric goods manufacture since 1949. It pointed out that the country was currently producing motors A.C. up to 100 H.P. and control and switch-gear production had commenced on a small scale. Besides, transformers up to 2,500 KVA and 33 KV were being produced in sufficient quantities. Since these items were all provided for in the original plan for the H.E.E. factory, the duplication of efforts in the field would, in the opinion of the Ministry, be a gross misdirection of scarce funds, to say nothing of the glut it would create in the market.

On a consideration of all these factors, the Ministry of Commerce and Industry recommended that before approaching foreign firms for technical collaboration, financial participation or both, the Planning Commission should, in consultation with all the Ministries concerned, make an assessment of the likely demand after five years, keeping in view the expansion in the field in the private sector during that period. And if such an assessment were to reveal the need for a more modest scheme, it could be entrusted to the private enterprise which could develop the project in collaboration with foreign firms.

The Reply of the Ministry of Production

The Ministry of Production, in reply, stated that its earlier note to the Cabinet was based on discussions held at the inter-departmental meeting which was attended by the representatives

of the Ministry of Commerce and Industry. As regards the argument that the original scheme did not fully take into account the existing and future supply position, the Ministry of Production was quick to point out that its conclusions were derived from a realistic estimate of the current situation, in particular the increasing demand for heavy electrical goods in the country. Besides, the representative of the Ministry of Railways had repeatedly pointed out to it that electrification of certain sections of the Indian Railways, so necessary for increasing line capacity and easing the transport situation, could not be contemplated without such a supporting industry within the country. The Ministry emphasised that its recommendation that the foreign firms should be invited to bring their project reports up-to-date would automatically bring about an assessment of the future requirements of the country.

The Ministry of Production felt that the Ministry of Commerce and Industry was over-optimistic in concluding that with the completion of most of the current projects a more modest scheme would be adequate. It pointed out that the phase of hydro-electric development started in the First Five Year Plan should naturally be expected to continue in a more intensified form during the Second Five Year Plan and thereafter. Certain projects, such as Kosi (Bihar/Nepal), Chambal (Rajasthan/Madhya Bharat), Koyna (Bombay), Rihand (U.P.), Ukai (Bombay), Krishna-Pennar (Madras/Hyderabad) were under consideration, some provision having already been made for them in the First Five Year Plan. It was added that the Ministry of Irrigation and Power generally agreed with the Ministry of Production.

The Ministry of Production concluded that, "there is unlikely to be any substantial change in the scope or the magnitude of the project envisaged in 1949, having regard to our requirements of electrical equipment both for capital, replacement and maintenance purposes. In view of this position, foreign technical participation would be essential. It is unlikely that private enterprise would be in a position financially to take up the project in collaboration with foreign enterprise. Besides, the magnitude and essential character of the industry rendered it necessary for the State to take over this responsibility."

The Views of the Ministry of Finance

At about the same time (January 1953), the Ministry of Production had also approached the Ministry of Finance for its concurrence in the proposal to establish a heavy electrical equipment factory in the country. But the necessary financial sanction was not granted on the ground that the facts and figures given by the Ministry of Production were not enough to prove conclusively that the setting up of such a project would be a paying proposition. However, approval was given to the incurring of an initial expenditure of Rs. 10 lakhs merely for assessing the possibility of setting up the project. It was made clear that this in itself in no way committed the Ministry of Finance to sanction further funds for the project if the Ministry of Production later on decided to establish one in the country.

The Inter-Ministry Meeting of April 4, 1953

The proposal was again fully discussed at an inter-Ministry meeting held on April 4, 1953, which was attended by the representatives of the Planning Commission and the Ministries of Commerce and Industry, Finance, Railways, Irrigation and Power, and Production. The meeting considered whether the demand in the country for electrical equipment had undergone any alteration since 1949, and the picture that was likely to emerge after about five years when the factory was expected to go into production. It was realised that development of multi-purpose river valley projects would be a continuing process and would constitute a permanent feature of the development of the country for several decades to come. As regards the rate of expansion, it was estimated that the power developed from the main projects and from the smaller ones undertaken by the States would in 1964 be higher by about 50% than the estimated production for 1958. Besides, it was clear that the demand for heavy electrical equipment as a result of the development of hydro-electrical power alone would be, at least, of the same magnitude and scope as was estimated in 1949, namely, 175,000 KW per annum. But even this assessment did not give a correct picture of the needs, as it did not take into consideration (1) requirements of heavier electrical equipment which would naturally not be produced in the new factory

during the earlier stages, and would therefore continue to be imported, and (2) requirements for replacement purposes.

The meeting further considered the question of electrification of railways for increasing the line capacity. In the view of the Ministry of Railways this single requirement, which could not be postponed alone would give rise to an additional demand of a considerable order. Still another item to be taken into calculation was the plans for steam generating stations which were bound to require electrical equipment on a large scale for installation, maintenance and replacement.

Taking into account all these factors it was felt that the total requirements under different heads would amply justify the establishment of heavy electrical equipment factory as an economic concern. It was even obvious that the demand for heavy electrical goods of all types was so large that a single factory would not be able to produce all the items but would have to confine itself to some of them, leaving the others to be covered by production on private account or imports. The state factory would also make possible the renovation of expensive heavy equipment which at present had to be discarded before the expiry of its full life for want of maintenance facilities within the country. The only other alternative was to dispatch it overseas for renovation, which was not an economical proposition. Above all, the factory would provide in the country for the first time facilities for training of technicians and for research in electrical engineering, the importance of which could not be over-emphasised.

It was also agreed at the meeting that technical advice from experts of world-wide repute would be essential for deciding the capacity and location of the factory, and the precise sectors of the demand which the factory should aim at supplying. It was necessary to so adjust production in the state factory that it would constitute an economic unit while at the same time not expose private enterprise to undue competition in the field. The consensus of opinion was that technical advice from foreign firms should be made acceptable only on the explicit condition that it would be followed by financial participation in the scheme by the firm concerned, as in the absence of such a condition "an accurate or realistic or even impartial appraisalment" could hardly be expected. It was beyond doubt that the success

of the scheme would depend largely on the correctness of the basic 'appreciation'.

Some of the participants in the meeting were, however, of the view that no firm would be in a position to prepare a project report on these lines unless the essential data were provided to it in advance. Hence, the Government would have to be contented with a technical survey, made independently of any financial involvement, however desirable that might be, for the execution of the scheme. It was conceded that this should be regarded as unavoidable. But the Ministry of Production did not support this view and felt that interested firms would have no real difficulty in securing the required data for themselves. The insistence on financial participation, it pointed out, had, besides, the added advantage that it would obviate disputes regarding location, the size and scope of an economic unit and other ancillary questions which were bound to arise if the task of 'appreciation' were entrusted to an agency, other than the one which would ultimately participate in the project.

In view of the considerations mentioned during the discussions and the strategic importance of the industry to the country, the following conclusions were reached at the meeting:

- (1) There was scope for the establishment of a factory to manufacture heavy electrical equipment.
- (2) One or two reputed firms in the field should be invited to prepare a project report regarding the type and size of an economic unit, keeping in view the probable market requirements and the capacity of the existing manufacturers.
- (3) The work should be assigned to a firm which would be willing to participate at the appropriate stage, in the capital structure of the proposed venture.
- (4) The Ministry of Production should, after the confirmation of these decisions by the Ministries concerned, prepare a note on the subject for submission to the Cabinet.

Inclusion of the Project in the 1953-54 Budget

The Ministry of Production accordingly presented the case in the second week of April 1953 for the approval of the appropriate committee of the Union Cabinet. The Cabinet

approved of the proposals and decided that the project should be included in the 1953-54 budget of the Ministry of Production.

The Government of India in the Ministry of Production thereupon invited firms of international repute to submit project reports, on the understanding that the firms should themselves propose a manufacturing programme which in their opinion would constitute an economic proposition and in which they would be prepared to participate financially as well as technically.

PUBLIC OR PRIVATE SECTOR?

The Power Plant Industry Presents its Case

In the meanwhile, these proposals had evoked great interest in the private sector. The Power Plant Industry and the Indian Electrical Manufacturers Association made direct appeals to the Government to give due consideration to the possibility of producing heavy electrical goods in the existing workshops.

The main point raised by the Director of the Power Plant Industry of Madras in his letter dated May 8, 1953 to the Ministry of Production was that instead of a concern like Firm Y being given the monopoly for the manufacture of heavy electrical equipment in a one-roof factory, a preferable alternative would be to utilise the numerous Government (P.W.D., Railway and Ordnance) and private workshops, both large and small, which might have spare capacity. It was also pointed out that, if necessary, additional machinery could be installed in these workshops for the manufacture of major components for which the existing facilities were inadequate.

Another suggestion put forward by the Director of the Power Plant Industry was that a body of designers and manufacturing shop experts including experienced supervising foremen could be obtained from abroad and made to work on designs purchased on payment of royalty from various specialised firms in other countries. The advantage of such a plan would be that it would bring about a dispersal of the industry. It would also not involve huge capital outlay or a standing workshop with heavy depreciation and deterioration. The designs for the different items could be secured most economically from various firms specialising in them, on a competitive basis instead of from a

single firm on the basis of monopoly.

These suggestions were considered by the Ministry of Production. It replied that the scheme envisaged by the Government was on a scale larger than what was visualised by the Director of the Power Plant Industry. The intention of the Government was that the proposed plant should meet a major portion of the demand for heavy electrical goods in the country. The demand as assessed in 1949 amounted to 300,000 KW and the existing facilities in the workshops were not adequate enough to meet it. Because of this inadequacy about Rs. 20 crores were being spent in foreign exchange every year to import heavy electrical items from abroad. Further, certain items like traction motors which were needed for the electrification programme of the railways could not be produced in the existing workshops.

As regards the second proposal made by the Director of the Power Plant Industry (that technical men should be imported from abroad and made to work on designs brought from specialised firms), the Ministry stated that it was unable to accept the suggestion. The appropriate committee of the Cabinet had already decided that technical assistance in itself would not be acceptable as the basis for collaboration in setting up a heavy electrical equipment plant but that any firm that wished to collaborate with the Government in the scheme should be prepared, over and above, for substantial financial participation. It was, therefore, not possible to revise the policy to suit the recommendations of the private industry.

In his note, the Director of the Power Plant Industry had also expressed the fear that the foreign firms would not only make it a condition that they supply all the machinery for the central works, but would also "either tacitly, impliedly or otherwise manage to get a commitment that in the interim period all orders for the entire requirements of the country" would also be placed with them. The Ministry of Production assured the Power Plant Industry that the latter point would be kept in view when negotiations were conducted, and that unreasonable terms would not be accepted in this respect. The Ministry made it clear that there was little danger of striking a bad bargain in securing the supply of the machinery. It was the established policy of the Government that the supply should be on a

competitive basis and orders should be placed with the firm only if conditions in respect of price, quality, and delivery compared with those of others in the market.

The note by the Director of the Power Plant Industry had further raised the question of fixing prices, especially of non-standard items which were designed and manufactured to fit one particular project. To this, the Ministry replied:

"It will obviously not be possible to follow the general rule of the landed cost of comparable imported items being used as a guide, but other alternatives will be possible; for instance, the efficiency of the manufacturing plant could be assessed on the basis of the standard items which also would be in production (in the private sector) and if from that criterion the production was reasonably efficient, cost with regard to the non-standard items could be accepted as reasonable. The formula could be specified by percentage of return on the capital with safeguards for incentive to efficiency being retained. Difficulties would no doubt be there, but they would not be insuperable."

The Ministry of Production added that it was the intention of the Government to utilise the existing facilities in the country in respect of ancillary and background industries as well as of heavy engineering industries and to expand and rationalise the ancillary units to provide assistance to the new enterprises. This would mean that the ancillary industries rather than being alternatives to heavy engineering would in fact be complementary to it.

Referring to the undesirability of one foreign firm having a monopoly in the field, the note of the Director of the Power Plant Industry mentioned that manufacture of all the items in a one-roof factory would not be a satisfactory proposition. The Ministry of Production explained that a proposal for splitting up the project into half a dozen or more separate factories was also under contemplation, as it was felt that a single factory covering the entire heavy electrical industry might not even be practicable. It added that the breaking up of the plant into distinct factories would receive the special consideration of Government, as it wished to avoid overlapping and lack of balance in the industrial development of the country.

*The I.E.M.A. Quotes the Views of the
Minister of Commerce and Industry*

The Secretary of the Indian Electrical Manufacturers Association submitted a note to the Government on July 23, 1953. It was based on a news item in *The Hindu*, dated June 24, 1953, which stated that Shri A.K. Chanda, Secretary, Ministry of Production, had gone to Europe to seek financial and technical assistance for the establishment of the proposed heavy electrical equipment factory.

The note called the attention of the Government to a statement made by the Minister of Commerce and Industry, while inaugurating the Annual General Meeting of the Indian Electrical Manufacturers Association on December 14, 1952. He had stated that there was no immediate prospect for the Government heavy electrical equipment factory to come into being and that if the private industry was interested in venturing into the manufacture of the heavy electrical items, the Government would be only too glad to render all possible assistance. The note of the Indian Electrical Manufacturers Association went on to say:

“Acting upon this suggestion some of the manufacturers in the Association have been seriously thinking of taking up the manufacture of heavy electrical equipment also. The only difficulty pointed out is the heavy amount of outlay expenses involved. If the Government can render financial assistance, some of the electrical manufacturers feel confident that they shall be able to undertake the manufacture of heavy electrical equipment quite successfully. The Association believes that the manufacture of heavy electrical equipment through the expansion of present activities of the existing manufacturers will, in the long run, prove more economical also.”

The I.E.M.A. added that the private sector feared that the Government factory would produce goods which were already being produced in the private sector and thus become a potential competitor in the field. Hence, it requested the Government to furnish full details regarding the programme of production of the proposed state factory. The note mentioned details regarding the programme of production in the

private sector and quoted the following indices of industrial production, published by the Directorate of Industries and Statistics in support thereof:

Interim Index of Industrial Production
(Base: 1946=100)

<i>Period</i>	<i>Electric Motors</i>	<i>Power Transformers</i>
1947	82.8	82.1
1948	130.7	210.3
1949	148.4	279.0
1950	178.3	440.8
1951	309.4	498.0
1952	343.4	550.8

The note added:

“It will be observed that during the period 1946-52 the electric motor and transformer industries have expanded by more than 300% and 500% respectively. This development has not been confined to only the quantum of production. The manufacture of transformers which was confined to ratings up to 500 KVA only in 1947-48 has gone up to ratings of about 2,000 KVA with manufacturing capacity for ratings up to 3,000 KVA and 33 KV on the H.T. (high tension) side. Similarly, in the case of motors which were manufactured up to 30 H.P. only in 1947 a tremendous rise is seen from 40,000 H.P. in 1947 to 150,000 H.P. in 1952 and the range has been increased from 30 to 100 H.P. with capacity up to 250 H.P. Actually, the industry has produced motors up to 160 H.P. recently. In drawing the programme of development in the Five Year Plan, the Planning Commission has expressed a desire that both these industries should maintain their rate of progress. It is to be hoped that within the next three to four years of the planning period the private sector of the industry will have produced motors up to 250 H.P.

and transformers up to 10,000 KVA. The Association is, therefore, of the opinion that in determining the scope and nature of the articles and equipments to be manufactured by the Government Electrical Factory, the Government will have due regard not only to the targets aimed at within the first Planning period but also what might be reasonably expected to be reached by the end of the second period of Planning..."

The note was addressed to the Ministry of Commerce and Industry. That Ministry found that it could not deal with it, as the subject came under the jurisdiction of the Ministry of Production. The Development Wing of the Ministry of Commerce and Industry accordingly transferred the note to the Ministry of Production. In its covering communication, dated July 1, 1953, it, however, observed that the scope of the manufacturing programme in the proposed Government heavy electrical equipment factory should not be such as would clash with the programme of manufacture of the existing industries. It also mentioned that the private sector connected with the manufacture of electric transformers and motors had made considerable progress, and that it was now capable of manufacturing transformers up to 3,000 KVA and 33 KV on the high tension side and A.C. electric motors of both squirrel cage and slipring type up to 100 H.P. The Ministry of Commerce and Industry was confident that by the time the new factory would start production the indigenous transformer makers would be in a position to manufacture transformers up to 5,000 KVA and electric motors up to 200 H.P. Hence, it pointed out, the suggestion made by the Indian Electrical Manufacturers Association was reasonable and should be given due consideration. It also suggested to the Ministry of Production to set up a Technical Sub-Committee to give adequate consideration to the capacity and production programmes of the private sector before deciding upon finally the manufacturing schedule of the proposed state factory.

The Ministry of Production Explains its Stand

In reply, the Ministry of Production stated that the precise scope and size of the state factory that was proposed to be established would be settled only after project reports, for the

preparation of which negotiations were in progress, were available. It also made clear that the intention of the Ministry was to assess carefully the developments which had already taken place or were expected to take place immediately in the private sector so that in planning to set up the proposed factory duplication of efforts would be avoided as far as possible. Broadly speaking, the attempt was to ensure that production in the public and private sectors should be complementary rather than competitive. It should be possible to do so with careful planning, as the field of heavy electrical equipment manufacture was wide enough to provide scope for both the sectors.

Towards the end of 1953, similar views were expressed by the Minister of Production in a speech delivered on the occasion of the Annual General Meeting of the Indian Electrical Manufacturers Association, held on the 12th December:

"To allay misgivings, I may say that the Government's intention in this respect is that the factory should be supplementary and complementary to the plants in the private sector in the field. Government's intention is mainly to take up such production as the private sector is not in a position to undertake. In fact, I hope that this plant when started would assist and strengthen the private sector technically and otherwise.

"You have requested that the representatives of your Association should be associated with the planning and execution of the project. As I have stated already the proposed factory, its size and scope will be planned bearing in mind the present and potential capacities of the units in the private sector and the requirements of the country, present and future. This should reassure you. What we all should cherish is a cooperative and progressive endeavour to fulfil the needs of the nation. I would like to add that the Ministries of Commerce and Industry and Production are in close touch with each other in regard to this project."

Questions in Parliament

At this stage, Parliament also showed some interest in the establishment of the H.E.E. project. On August 19, 1953

Shri S.C. Samanta (Congress) sought information, in the Lok Sabha, on the following points:

- “(a) Whether it is a fact that out of the lump sum provision of Rs. 50 crores in the First Five Year Plan for basic industries and transport a sum of Rs. 7 crores has been provided for the heavy electrical equipment plant?
- (b) If so, amount going to be spent in 1953-54?
- (c) The works that are expected to be taken up in the year?
- (d) Whether the recommendations of the Exploratory Committee set up early in 1948 in the matter will be taken into consideration? and
- (e) If so, to what extent?”

The Minister of Production answered in the affirmative to clause (a) of the Question. As regards clauses (b), (c) and (d), he stated that firms of international standing willing in principle to participate financially and technically in the project had been invited to conduct a re-survey of the prevailing conditions; that the Government's share of expenditure was estimated to be of the order of Rs. 5 lakhs during 1953-54; and that the general recommendations of the Exploratory Committee would be considered in the context of the changed conditions but that a final decision would be taken only after project reports had been received by the Government.

Fresh Project Reports by Foreign Firms

As decided by Cabinet in April 1953, firms of standing, which were prepared in principle to participate financially, were invited by the Ministry of Production to put forward schemes for the Government's consideration. Among the firms who evinced interest were the Associated Electrical Industries of the U.K., Firm B, Firm C, Firm D, Firm X, and Firm Y. But only the Associated Electrical Industries and Firm B submitted fresh reports and proposals.

The A.E.I. was of the view that an investment of Rs. 20 crores on a project for making heavy items of electrical equipment might be expected to yield a return of 5% after a period of nine years provided no interest was charged during the period. It, however, left open the question of items to be produced, but

added that the production of heavy electrical equipment would be an uneconomic proposition for any private enterprise to undertake. It, therefore, made the following two alternative suggestions to the Government, to be adopted singly or together: "(1) to develop only a single line of electrical manufacture, which appears under present conditions to offer the greatest possible chance of being an economic venture, namely, traction equipment, or, (2) the Government to take over an existing factory and to expand its operations as and when it is economically practicable."

The report of Firm B provided for a project involving an investment of Rs. 13.6 crores. This factory was to undertake the manufacture of all ranges of equipment, concentrating, however, on the lower ones to begin with and gradually taking up the production of the heavier machinery. It was felt that such an enterprise could, in time, be economically operated if sufficient orders could be assured to it. It was also mentioned that certain assistance by way of a subsidy from the Government or, as an alternative, concessions such as exemption from taxes and/or higher prices for the products, would be necessary during the early stages so as to enable the project to overcome its teething troubles.

Assessment of the Current and Future Capacity of the Existing Units

The project reports submitted by the A.E.I. and Firm B were discussed at an inter-Ministry meeting held on March 31, 1954. In view of the suggestions made by the A.E.I., the Ministry of Commerce and Industry once again underlined the importance of a proper assessment of existing capacity for the production of heavy electrical equipment in the country. It was, therefore, decided at the meeting to conduct a survey of the current production of the existing units and of the additional production that might be expected from the existing capacity and the expansion plans of the industry. The Ministry of Commerce and Industry reiterated its view that there were signs that the production of motors and transformers was already expanding and as the items included for production in the state factory, as conceived at that time, would inevitably overlap with the production of the existing units, particularly in the initial period,

the Ministry of Production would be well advised to approach the problem with caution and to base its conclusions on a truly realistic assessment of the situation. The Ministry of Commerce and Industry would itself call on its Development Wing to prepare a review indicating the current capacity of the existing units together with the level of development that these units could attain after a certain period, each in its own specialised field. This review, which was undertaken by Shri Jangbir Singh, Industrial Adviser to the Ministry of Commerce and Industry, was completed within a short time and a note on his findings was submitted on April 6, 1954, to the Ministry.

Discussions in Parliament

The subject was again raised in Parliament (the Lok Sabha) on April 9, 1954, during a debate on Demand for Grants of the Ministry of Production. Shri Meghnad Saha* expressed the view that: "the Government should take the trouble of having a heavy machinery industry in this country, as was planned by the Director of Industries, Dr. J.C. Ghosh, a number of years ago. If the Hon'ble Minister of Production just makes a search through his archives, he will find that plan there."

In reply, the Minister of Production said that he agreed with Shri Saha on the urgent necessity of setting up heavy machinery industry in India. He pointed out that as part of that industry the Government had taken on hand the heavy electrical equipment factory project in order to meet the requirements of the several hydro-electric installations that had sprung up in the country and also to avoid too much dependence on foreign imports for meeting the country's needs in the field. He further informed the House that two foreign firms of repute had been invited by the Government to prepare project reports, which had since been received by the Government and were under its active consideration.

Participating in the debate, Shri Viswanatha Reddy (Congress) said that the project should be set up during the period of the First Five Year Plan, as the need for such a factory was urgent not only for strategic reasons but also because of

2. India's eminent physicist; associated with the United Socialist Organisation founded by late Shri Sarat Chandra Bose.

the expected development of hydro-electric energy during the Plan period and the consequential increased demand for motors, armatures and transformers.

Further questions were put to the Minister of Production on April 29, 1954. Pt. D.N. Tiwary (Congress) requested information on the following aspects of the matter:

“(a) Whether Government have received the report of the experts of foreign firms in connection with the establishment of a factory for the manufacture of heavy electrical equipment; and

(b) If so, what are its main recommendations?”

In reply, the Parliamentary Secretary to the Minister of Production stated that two firms, the Associated Electrical Industries and another firm, had submitted preliminary reports. The reports gave in broad outline the proposals for the establishment of a state unit for heavy electrical equipment. He added that it would not be in the public interest to give more information since discussions on the subject were currently being held in the Ministries.

Shri L.N. Mishra (Congress) enquired how the heavy electrical industry would be financed—whether by the public or by the private sector? To this the reply was: “this is going to be in the public sector because it will be a state undertaking. But I want to say that the foreign firms also are expected to be our financial partners in this scheme.”

Report of the Industrial Adviser

After a review had been made by Shri Jangbir Singh, Industrial Adviser to the Ministry of Commerce and Industry, Shri M. Hayath, Member, Central Water and Power Commission, and a Deputy Secretary of the Ministry of Production visited the factories in Calcutta, Bombay and Bangalore to make a detailed study of the existing position, and submitted a note to the Ministry of Production on July 26, 1954.

The report of the Industrial Adviser indicated that the current capacity in the existing factories for the production of motors taken together was 300,000 H.P. These factories had an expansion programme of the order of 103,000 H.P. Therefore, the total capacity in three to four years would be about 400,000 H.P. The additional capacity likely to be available in the

production of motors would approximate at least to 50,000 H.P. to 75,000 H.P. per annum, if Crompton Parkinson (Works) Ltd. and Kirloskar Electric Works Ltd., the A.E.I. and Government Electrical Factory, Bangalore, could carry out their programmes of expansion. Thus, the ultimate capacity in the country for the production of motors would be in the range of 450,000 H.P. to 475,000 H.P. annually. It would mean an increase of 200,000 H.P. over the existing capacity. The Government factory to be set up also contemplated an output of 228,500 H.P. annually in the field, but this requirement could equally be met by expansion in the existing factories.

In respect of the production of transformers the report mentioned that much progress had been made during the past five years and the output had been trebled. About eight firms were producing transformers of the order of 1,000 KVA. The existing total capacity per annum was 308,084 KVA. With the completion of the expansion programmes the capacity would be increased by 259,000 KVA annually. The new state factory would be able to bridge the gap of 2,100 KVA, especially because the expansion programmes of Cromptons and the Government Electrical Factory at Bangalore had not been finally settled.

The report mentioned that at that time no generators were being produced in India but that M/s Kirloskar Electric Works, Bangalore, had plans to produce diesel generating sets and ultimately to produce alternators up to 200 KVA; but no hydraulic turbines, envisaged for production in the H.E.E. factory, were being produced in the country.

Report of Member, Central Water and Power Commission

Shri Hayath, in his note, agreed with the Industrial Adviser that the requirements of the country for small-size motors and transformers had been partly met by indigenous production, but pointed out that the bulk of the heavy equipment required for the generation, transmission, distribution and utilisation of electric power had to be imported and several million dollars had to be spent every year on foreign exchange to secure such equipment. The estimate of the current and future capacity of the existing units, made by the Ministry of Commerce and Industry, though correct, did not present the picture in its true perspective. The new state factory would take up the production

of equipment of a size which was neither being produced nor was contemplated for production in the private sector. The items to be produced in the proposed state factory ranged from hydraulic turbines of 1,000-25,000 KW to insulating material, covering about 20 items in all. The study undertaken by Shri Hayath had revealed that of these 20 items the existing factories could produce only three items and that too of lower ranges; and there were no definite plans for the production of the remaining 17 items. Further, the real potential capacity of the industry in regard to the production of motors was only nearly half of what had been estimated on the basis of licences for manufacture. Shri Hayath was, therefore, not so optimistic as Shri Jangbir Singh regarding the capacity of the private sector to supply sufficient quantities of motors needed. He estimated that the potential capacity in the field of transformers was of the order of 531,000 KVA, while no transformers of voltage above 33 KV had so far been made in the country.

On the basis of his study Shri Hayath came to the conclusion that the setting up of the new state H.E.E. factory would not in any way affect adversely the development of heavy electrical equipment industries in the private sector. There was room for producing even those items that were being manufactured in the private sector, to supplement the existing capacity and the potential capacity assessed. Besides, he pointed out, the production of the 17 items which were not being produced in the private sector would constitute the bulk of the manufacturing schedule of the new factory. The intention of the Government of India to set up the H.E.E. factory had been known to the private industrialists for the last six years. Had they been keen on the expansion of their manufacturing schedule they would have formulated plans for the manufacture of heavy electrical equipment. Much time had already been lost in trying to accommodate the private interests and the immediate establishment of state factory was a dire necessity.

The Joint Report of the Two Experts

Shri Hayath's note was considered at an inter-Ministry meeting held in the middle of August 1954 in the Ministry of Production. The Ministry of Commerce and Industry did not agree with the views and conclusions expressed in Shri Hayath's note.

It pointed out that though Shri Hayath was an expert on construction, erection and working of power-stations, transmission lines and the like, when it came to a consideration of matters of engineering production the views of its Industrial Adviser, Shri Jangbir Singh, deserved greater attention. It was therefore decided that Shri Hayath and Shri Jangbir Singh should discuss between themselves their respective reports and come to a joint finding in respect of the existing capacity of the private sector. After holding detailed discussions with the representatives of the concerns engaged in the production of electrical equipment in the country, the two experts submitted a joint report on August 23, 1954, setting forth:

- (a) the existing capacity and additional capacity which would result from implementing the schemes which had already been sanctioned;
- (b) schemes of further expansion which the existing units were contemplating and hoped to implement, with some assistance, if there was no direct competition from the public sector; and
- (c) a list of items which the existing units were not in a position to manufacture.

Discussions with Electrical Equipment Manufacturers

Meanwhile, discussions were held in the Ministry of Production, with the representatives of principal domestic electrical equipment manufacturers on August 24, 1954. These mostly related to the state of the industry, the progress made or expected to be made in the implementation of expansion programmes already sanctioned, the plans of the industry for the future and the assistance, financial and otherwise, which would be required by the firms for the implementation of the expansion programmes under contemplation. The manufacturers in the private sector stated that they would gladly take up expansion work to the extent envisaged in the H.E.E. project provided that the state factory, if established, would not undertake the manufacture of those items. They further stressed the need to avoid duplication and overlapping among industries in the private sector itself, in respect of articles with limited demand such as motors above 500 H.P. and traction motors. They expressed their willingness to meet any contingency as a result of a rapid upward rise in the

demand curve by arranging for two or three working shifts, as that would minimise overhead costs and result in more output for less capital expenditure. Some of the electrical manufacturers were of the view that the pace of development could be accelerated if the Government would give financial assistance. The National Electric Industries stated that it would need a subsidy from the Government for the production of items of a limited demand. All the representatives agreed that if the Government could give some assurances of assistance, they would undertake to start production by a specific date.

At this stage the Ministry of Commerce and Industry thought that the nature of the problem had changed since the proposal was first mooted to set up a heavy electrical equipment factory in the country and urged that the situation should be re-assessed before a decision could be taken to set up a H.E.E. factory. It quoted Shri N.N. Iengar, formerly Electrical Commissioner to the Government of India and the then Technical Adviser to Tata Hydro Agencies Ltd., who was closely associated with the proposal for the H.E.E. project, to substantiate its stand on this point. Shri Iengar had sent a note to the Ministry of Commerce and Industry on August 22, 1954, in which he made the following points:

First, that the picture had changed considerably from what it had been when the first Exploratory Committee was set up to consider the possibility of manufacturing heavy electrical equipment in India. The considerations which had then prompted the original proposal for setting up such a plant were: (i) the private sector was not capable of taking up the manufacture of heavy electrical equipment, and (ii) the establishment of state factory was the only alternative to securing costly dollar plant from the U.S.A. or waiting indefinitely for goods to be obtained from the U.K. These considerations were no longer important because the private industry in India had since made headway in the manufacture of several standard items like transformers, motors, switch-boards, etc. and could be helped to produce the heavy electrical goods as well. Furthermore, keen competition had developed in the production of heavy electrical equipment in the world and

several manufacturing units had been established in France, Japan, Italy, Belgium and West Germany and it was now possible to obtain the different items on a competitive basis.

Secondly, every effort should be made to foster the healthy growth of the private sector. Since the industry had done well in the past few years, the Government should help it to manufacture the items of heavy electrical equipment included in the production schedule of the proposed state factory.

Thirdly, private companies would be in a better position to choose their foreign collaborators on a competitive basis; hence if the Government could give sufficient encouragement to them, India could attain self-sufficiency in the field within a few years' time.

THE QUESTION IS REVIEWED AT AN INTER-MINISTRY MEETING

The entire question was accordingly again reviewed in the light of all this information at an inter-Ministry meeting held on August 26, 1954, at the initiative of the Ministry of Commerce and Industry. The Secretary of the Ministry of Production, representatives of the Planning Commission and the Ministry of Irrigation and Power were present at the meeting. After detailed discussions the following conclusions were arrived at:

(a) The items of equipment which the existing units were not in a position at all to undertake were as under:

1. Hydraulic turbines with accessories (1,000-25,000 KW).³
2. Hydraulic turbine generators (1,000-25,000 KW).
3. Static Capacitors.
4. Locomotive control, multiple unit car control equipment.

3. Hydraulic turbines were then being manufactured by the mechanical engineering industry but designs had to meet electrical requirements and the responsibility for their manufacture in the country would have to be that of the heavy electrical equipment factory. The demand for these items would be intermittent but their inclusion in the programme would be desirable because almost all the larger power schemes were adopting voltages higher than 69 KV.

5. Ignition rectifiers.
 6. Insulating materials for high tension use.
 7. D.C. Generators (30-200 KW).
 8. Switch-gear.
 9. Transformers (for voltages above 69 KV).
 10. Steam turbine generators (1,000 KVA and above).
- (b) In order to attain as much self-sufficiency as possible, it was essential that the items 1 to 10 mentioned at (a) above should be produced in the country. No country which wished to develop its industrial potential could afford to be wholly dependent on other countries for supplying its requirements of basic power plant. It was, therefore, agreed that the state should undertake the manufacture of these items.

It was generally agreed that the setting up of the H.E.E. factory within the country would, apart from yielding considerable savings in foreign exchange, bring about certain indirect benefits which in the long run would be sufficient enough to offset the losses likely to be sustained at the initial stages of operation. The indirect benefits would include: training in the manufacture of heavy electrical equipment, ability to repair and recondition equipment on the spot and its maintenance without assistance from outside agencies.

Alternative Proposals of the Ministry of Production

The Ministry of Production opined that in order to reduce the period of uneconomic working it was necessary that the Government factory should also produce the smaller items of equipment. Here, it suggested two alternative possibilities.

The first alternative was that certain items which were considered essential for gaining experience and for balanced economic production should be included in the programme of the new factory to the extent considered necessary in spite of the fact that some of these items were already being manufactured in the private sector and the remaining were in the expansion plans of some firms in the private industry. The list of these items would include:

1. Power transformers rating 5,000, 10,000 KVA, voltages 11 KV to 69 KV.
2. Outdoor current transformers, 2.5 KV-138 KV.

3. Outdoor potential transformer, 11 KV-138 KV.
4. Outdoor oil circuit breakers, 11 KV to 69 KV.
5. Outdoor disconnecting switch, 11 KV-138 KV.
6. Switch-boards and control desks.
7. Squirrel cage motors, ratings 50-500 H.P.
8. A.C. wound rotor motors, ratings 50-500 H.P.
9. A.C. synchronous motors, 50-1,000 H.P.
10. Direct current motors, ratings 50-150 H.P.
11. Industrial motor control, various types from 50-1,000 H.P.
12. Traction motors, ratings 120 H.P. to 450 H.P.
13. Train lighting dynamos and equipment.

The other alternative was that the Government should take over an existing factory and develop it to manufacture the heavy items which, according to the conclusions arrived at the inter-Ministry meeting held on August 26, 1954, could not be produced by the existing manufacturing units in the country and then gradually expand it to cover the production of those items. In order to enable it to achieve the envisaged target for production the Government would require the collaboration in some form or other of a foreign firm or firms, well renowned in this field of production.

Of the two alternatives suggested by it, the Ministry of Production indicated its preference for the first alternative, which, it felt, would enable comprehensive planning from the start. Although the second alternative would lead to a considerable saving in time initially, an already established firm was very likely to be handicapped to a certain extent in planning the layout and making arrangements for foreign collaboration.

The Ministry of Commerce and Industry Favours Taking Over and Expansion of an Existing Unit

While agreeing with the contention of the Ministry of Production that the State should make arrangements for the manufacture of the items which the private sector was not in a position to produce and also that any new factory which would manufacture only these items was bound to be uneconomical during the early stages, the Ministry of Commerce and Industry stated that the first alternative solution suggested by the Ministry

of Production would not be acceptable to it. That would mean the new factory, for purposes of its economical working and gaining experience, would also have to take up the manufacture of certain sizes of equipment which were already being manufactured by the private sector. It was obvious that the new capacity in this range would be approximately equivalent to the potential capacity of existing units like Cromptons or the National Electrical Industries Ltd. It would include the production of 94,000 H.P. of motors of 50 H.P. and above, approximating to the existing capacity of Cromptons, and 150,000 KVA of transformers which would be equivalent to the current capacity of the National Electrical Industries Ltd. The Ministry of Commerce and Industry, therefore, felt that it could not accept the view of the Ministry of Production that the establishment of such capacity in a new factory would not affect the existing units adversely but would on the contrary provide healthy competition. The estimate that had been made of an annual demand by 1960 was for motors at 500,000 H.P. and for transformers at a million KVA. The existing capacity on one shift for motors was 300,000 H.P. and the additional capacity sanctioned was 143,000 H.P. The existing capacity for transformers (one shift) was 443,000 KVA and the additional sanctioned capacity was 300,000 KVA. Factories of this character could work three shifts when necessary but would have to work at least two shifts for economic production.

The Ministry of Commerce and Industry, therefore, considered that "the existing and sanctioned capacity would be more than adequate to meet the estimated demand of all standard items in 1960 even after making ample allowance for competition among the various factories". Any further addition of capacity would take competition to an unhealthy state. Above all, the competition offered by a state factory, with unlimited resources behind it, would pose a greater source of danger than competition among the private concerns themselves. Because of these overwhelming considerations, the Ministry of Commerce and Industry expressed its inability to agree with the recommendation that a new Government factory should be established with the programme of manufacture suggested by the Ministry of Production in the first alternative. It, however, urged that a solution on the lines of the second alternative,

proposed by the Ministry of Production, would be more acceptable to it. The Ministry of Commerce and Industry reiterated that in arriving at this conclusion it was prompted by the following considerations:

- (1) The foreign firms which had submitted project reports had clearly stated that it would not be possible for any factory to start production in the higher ranges of electrical equipment without first going through the process of making the lower ranges. This was essential (a) to make the unit more economical, and (b) for imparting experience and training to the staff in making relatively simpler types of equipment before launching on the production of more complicated machinery.
- (2) A state factory to come into production would take a number of years even to reach the level of production already attained by private firms. Firm B had also mentioned that transformers of higher KVA could be produced better and quicker by the existing manufacturers rather than by new units.
- (3) Expansion of the existing capacity would be cheaper especially because it would avoid wasteful competition in the ranges where the country had reached self-sufficiency; the investment needed would also be of a lower order.
- (4) Finally, the estimated saving of foreign exchange of the amount of Rs. 5 crores or so after a lapse of 15 years when the factory was in full production was not in itself an attractive proposition for setting up the factory.

A Compromise is Found

After giving thought to the views of the Ministry of Commerce and Industry, the Ministry of Production expressed, at the inter-Ministry meeting held on August 26, 1954, its willingness to accept the second alternative, that is, to take over one of the existing factories which already had experience in the manufacture of electrical equipment and plant of small ranges with plans for expansion to higher ranges, and to develop it to produce items of heavy electrical equipment, maintaining at

the same time the production of items covered by the existing potential capacity and its expansion programme.

The Ministry of Production further mentioned that electrical traction equipment for railways was not at all being manufactured in the country and all the plans of the Government at the various stages for production of heavy electrical equipment had included this item. The A.E.I. had also pointed out that the production of this item would in itself place the project on a strong footing and make it an economic venture. The Ministry of Production strongly felt that traction equipment which would serve to make the state factory less uneconomical than otherwise should remain on its production programme.

At this stage, the Ministry of Commerce and Industry explained that the progress made in the manufacture of motors, transformers, low tension switch-gear and low tension insulating materials by the private firms so far and the expansion programme of these firms covering higher ranges in these lines as well as manufacture of high tension switch-gear, small generators and alternators and traction motors and other equipment was encouraging, and there was no doubt that the private industry would be able to meet the requirements of the country about 1960, as then estimated, if assisted by Government. The investment necessary for carrying out of the plans of expansion of the private industry was estimated to be of the order of Rs. 4.5 crores. Of this, the firms concerned would be able to provide Rs. 2½ crores from their own resources but the balance of Rs. 2 crores would have to be provided by the Government. These firms should be encouraged and assisted to carry out the expansion programmes so that they, together with the existing unit which might be taken up for development by the Government, should be able to meet the country's full requirements of the standard items of electrical equipment.

The Ministry of Production agreed to this recommendation subject to the qualification that adequate attention should be given first to the possibility of producing traction equipment at the factory to be taken over by the Government for development.

On the same day (August 26, 1954) the Secretary of the Ministry of Production gave a resumé of the discussions and conclusions arrived at in the inter-Ministry meeting to the

Minister of Production. The Minister's directions were that a heavy electrical equipment plant must be set up and it must include standard items sufficient enough to make it an economically viable unit. The Minister also indicated his approval of the suggestion to build the H.E.E. project round the existing capacity of the Government Electrical Factory, Bangalore.

The Matter is Submitted to the Government

The Ministry of Production immediately prepared a note based on the discussions and decisions mentioned above, and submitted it for the approval of the appropriate committee of the Cabinet. The recommendations made were as follows:

- (a) An existing factory should be chosen and developed to take up, along with its current production and production planned for in its expansion programmes, the manufacture of items of heavy electrical equipment listed for the proposed state factory at the inter-Ministry meeting held on August 26, 1954.
- (b) Consideration should be given to the question of producing traction equipment at the chosen factory.
- (c) The other existing units should be encouraged and assisted.
- (d) For implementing the proposal at (a), a preliminary selection should be made of the factory to be developed and project reports for its development should be obtained from competent technical consultants of international standing, who should be asked to prepare them in collaboration with an Indian team of experts. After assessing the comparative merits of the reports received, a final selection should be made of the factory to be developed and of the competent firm in association with which this development should take place. For this purpose the Ministry of Production should constitute a Negotiating Committee consisting of the representatives of the Ministries of Commerce and Industry, Irrigation and Power, Finance, Railways, and Production. The Committee should also conduct negotiations with one or more firms, as might be considered appropriate, for the precise terms of the technical collaboration proposed.

THE GOVERNMENT DECIDES

The Heavy Electrical Equipment Committee, 1954-55

The note of the Ministry of Production was considered by the appropriate committee of the Cabinet in the middle of September 1954. It was decided that the manufacture of heavy electrical equipment in India was an urgent necessity but before any final decision in this regard could be taken, certain aspects of the project needed to be thoroughly investigated by an expert committee. The Ministry of Production accordingly decided in October 1954 to constitute a Committee to enquire into and report on the manufacture of heavy electrical equipment in India. The members of the Committee were: Shri N.N. Iengar, Technical Adviser, Tata Hydro Agencies; Shri G. Sundaram, Consulting Electrical Engineer to the Government of Madras; Shri P.C. Kapur, Joint Director (Mechanical Engineering), Railway Board; Shri S.A. Gadkary, Consultant (Power), Planning Commission, who was to act as convener; and Shri G. Chandy, Chief Electrical Engineer, Government of Mysore. The Committee was appointed on October 14, 1954, with the following terms of reference:

The manufacture of heavy electrical equipment being an urgent necessity, the Committee will investigate:

1. The extent to which these can be met by current production in India and by its possible expansion in the immediate future, taking into account the unused capacity available in Government establishments and workshops, including the state workshops;
2. The exact requirements of the country in the matter of heavy electrical equipment;
3. The residue of the requirements left to be covered; and
4. How this residue ought to be met speedily and economically and through what agency?

The Committee made an assessment of the total requirements of the country, the existing capacity, additional capacity likely to be available, unused capacity in Government establishments and workshops, including the state workshops, and the balance of requirements left to be covered. It found that the production of electrical goods in India at that time was mostly confined to small transformers and motors, and, what was more, production

of heavy plant was neither being undertaken nor were there any plans for its future development in the existing units. The Committee was convinced that there was no unused capacity, suitable for the purpose, in Government workshops or factories either. It, therefore, came to the conclusion that the only way open for manufacturing heavy electrical plant in the country was for the state to establish a factory for the purpose. The Committee accordingly recommended that the following items should be taken up for manufacture in the state factory:

1. Hydraulic turbines and generators—175,000 KW per annum.
2. Generators for diesel sets—34,000 KW per annum.
3. Transformers 33 KV and above—50,000 KVA per annum.
4. Current and potential transformers.
5. Static capacitors—54,000 KVA per annum.
6. A.C. circuit breakers—11 KV and above, all heavy ratings for lower voltages.
7. D.C. circuit breakers.
8. Switch-boards and Control Desks.
9. Direct current machines:
Generators and Exciters—7,000 KW per annum.
Welding generators—required number of units.
Motors—2,000 H.P. per annum.
10. Traction motors, apparatus and equipment—75,000 H.P. per annum.
11. A.C. industrial motors, ratings of 200 H.P. and above—50,000 H.P. per annum.
12. Industrial motors control—within the range of motors ratings for state factory.
13. Insulating materials—to meet total requirements of the country.

In respect of transformers, the Committee recommended that the technical consultants should be asked to consider whether the Government Electrical Factory, Bangalore, could be utilised in order to expedite the manufacture of heavy transformers. It further suggested that steam turbines and generators should be taken up at a later stage.

If this list of items were to be manufactured in the state factory, the Committee was of the opinion that it would allow

wide scope to the existing private factories to manufacture the following items (to the extent indicated against each item) for which they were most suited:

Transformers 33 KV and below—650,000 KVA per annum.

A.C. industrial switch-gear—light and medium ranges.

Disconnecting switches—all sizes and voltages.

Switch-boards—industrial types.

Instruments, meters and relays.

Direct current machines—up to 10 H.P.

A.C. industrial motors—750,000 H.P. per annum.

A.C. and D.C. industrial motor control.

The adoption of such a scheme, it was argued, would ensure a co-ordinated development in the electrical manufacturing industry. The Committee further recommended that a well-reputed firm of international manufacturers should be selected immediately to serve as consultants for the project, which should be accorded a high priority.

The other main observations of the Committee were:

- (1) It had not been possible to make an accurate estimate of the capital cost of the new plant, but in 1950 it had been estimated at Rs. 22 crores. A correct estimate could be obtained only after the consultants had made a detailed report on the existing conditions.
- (2) In order to cover the loss which was bound to occur in the early period, the power projects, which would be the chief consumers, should bear a reasonable part of the difference between the higher production costs and the average world prices, the balance being debited to a development fund to be written off from the profits in the later years.
- (3) Financial collaboration should not be made a necessary condition for the selection of consultants notwithstanding the fact that the proposed factory was not likely to be self-supporting during the initial period. Such a condition would unduly restrict the field of choice of prospective consultants.
- (4) Since the manufacture of heavy electrical equipment required a high degree of skill and precision, it would be necessary to create new training facilities and to phase the programme in such a manner that adequate

technical staff were available at different stages of development of the state factory.

- (5) Indigenous capacity for the principal items of "raw materials", such as electrical steel sheets, heavy castings and steel forgings, which were not being produced in the country or the current production of which did not fully cover the requirements, should be developed as early as possible.

*Inter-Ministry Discussions on the
Report of the H.E.E. Committee*

The report of the H.E.E. Committee, which was submitted to the Ministry of Production on January 29, 1955, was discussed at an inter-Ministry meeting held on February 14, 1955, at which the representatives of the Ministries of Commerce and Industry, Finance (Industry and Commerce Division), Irrigation and Power, Production, and Railways, and the Planning Commission were present.

There was general agreement on the assessment of requirements given in the report of the Committee and it was accepted as constituting the basis of planning for the proposed heavy electrical equipment factory in the country. The conclusions reached by the Committee under the various heads were generally endorsed. However, the Ministry of Commerce and Industry suggested a few marginal adjustments as follows:

- (1) Certain licences had been issued to private firms for the manufacture of switch-gear and some of these firms had already made arrangements to import some parts for their manufacture. Accordingly, the state factory should start with the production of switch-gear of from 11 KV upwards, and above 250 MVA rupturing capacity.
- (2) It would be advisable to raise the lower limit suggested by the Committee for motors from 200 H.P. to 250 H.P.
- (3) The Committee had suggested that transformers of the order of 500,000 KVA should be produced in another factory. It would be advantageous to distribute the production of this huge quantity among several factories.

There was also a general agreement, during the discussions at the meeting, that there was bound to be some overlapping

between the state unit and the existing units in the production of heavy electrical items, since the state factory must be planned to be as economic as possible. In this connection, it was decided that—

1. The state factory should manufacture motors from 200 H.P. and above as proposed by the Committee but the private sector should be permitted to manufacture motors up to 250 H.P.

2. Where a private unit had taken steps to import some parts for the manufacture of switch-gear in 11 KV range, a quantitative limit in the 11 KV below 250 MVA range rupturing capacity may be assigned to it or circuit-breakers in these ranges (11 KV below 250 MVA) might be considered as an item of inevitable overlap between the state factory and the existing unit.

3. For the manufacture of heavy transformers, the technical consultants should consider not only the Government Electrical Factory, Bangalore, as suggested by the H.E.E. Committee, but also other suitable units with a view to advising which factory should be selected for development.

4. The opinion of the consultants should be obtained on the initial programme including the manufacture of the items which had been proposed by the Committee for being taken up at a later stage.

5. While financial participation would not be an essential condition it would not be ruled out, and other things being equal, consultants offering such participation would be preferred.

The Final Decision

The Ministry of Production, accordingly, recommended in early March 1955 to the Government that action might be taken along the following lines:

- (1) A new state factory to manufacture the items of heavy electrical equipment, as recommended, should be established.
- (2) Some qualified firms of leading electrical manufacturers of international repute should be invited to discuss the scheme and to indicate the basis of their technical and, if possible, financial collaboration, and thereafter one firm should be selected to prepare a detailed scheme for the project.

- (3) The project reports should be called for on the basis that while financial participation by the technical consultants would not be a necessary condition, schemes offering such participation would be given special consideration.

The appropriate committee of the Cabinet, while according its approval to the proposals contained in the note of the Ministry of Production, desired that a committee of Indian electrical experts should be set up urgently to advise Government in regard to the proposed plant and more particularly as to whom they should consult and invite for a discussion of the scheme for the proposed plant.

* * *

Questions were asked in the Lok Sabha on March 29, 1955 regarding the heavy electrical equipment project. Shri H.C. Heda (Congress) enquired whether the Committee on the H.E.E. project had submitted its report, and if so, what were its main recommendations? The reply given by the Parliamentary Secretary to the Minister of Production was that the Committee had recommended the setting up of the H.E.E. factory in the public sector in collaboration with foreign firms. Shri Heda further wanted to know the cost of the project. In reply the Parliamentary Secretary gave the estimated outlay indicated some years back, which was Rs. 22 crores.

On the same day, some other questions were put to the Minister of Production. Smt. Tarkeshwari Sinha (Congress) enquired whether the A.E.I. and another foreign firm had submitted their project reports. To this, the reply given by the Minister was that some reports had been submitted some years earlier but the Government had now requested for fresh reports. Shri T.B. Vittal Rao (Communist) expressed concern over the delay in the matter of this project, which he pointed out had restricted the expenditure on the scheme to Rs. 2 crores as against Rs. 7 crores provided in the Plan. He wanted to know what steps the Government proposed to adopt to expedite the matter. In reply, the Minister of Production said that there had been some unavoidable delay because certain preliminaries had to be gone through before a final decision could be taken in the matter. He added: "... without being sure about data, we could not proceed with it. Government are taking all possible steps to

expedite the matter." Finally, Shri Heda drew attention to the apprehension expressed in the Press regarding the low return that would accrue on the capital invested. The Parliamentary Secretary replied that it was true that there would be some losses in the initial stages but Government was discussing the possibility of manufacturing other types of machinery also which would help to reduce the overall loss.

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General Causes of Delay in Decision-Making

About Industrial Projects

Soon after the Government decided to set up the H.E.E. factory in the public sector, the Ministry of Production submitted a note indicating the causes for delay in decision-making with respect to some *other* projects. It stated, *inter alia*, as follows:

"Any factory which is rigidly asked to exclude whatever is being done by the private sector is, and must be, affected adversely in its own economics. If we are asked to start at the higher ranges and to restrict ourselves, whether it be machine tools or heavy electrical plant, we lose the benefit of 'bread and butter' items and also the flexibility and advantage of experience. A certain amount of production in the smaller and medium ranges is desirable to balance the economics of almost any factory.

"We have now been told quite clearly that there is ample room for the further manufacture of machine tools in the private sector, and in fact the Ministry of Commerce and Industry now think that there has to be further development of capacity, and even probably the setting up of new machine tool factories in the country. This should be an answer to the charge that an excess of lathes have been or are being manufactured. There is another aspect to consider: of about 102 lathes, manufactured by one private manufacturer (who is frequently before the public) in five years, about 96 were sold to Government. We must get these figures confirmed; but if they are anywhere near correct, it is one answer to the complaint that the Government factory has come into being and stolen from the private sector.

"In the machine tool business we have been going over the same phases as we did in the case of steel and then in the case of coal and heavy electricals. The first phase comes when Government considers, and we all feel, that the country requires

more of something; we feel that because our whole progress depends upon our increasing production and consumption of the particular item: steel or coal or machine tools. The private parties, who till then naturally have a virtual monopoly, are called into consultation. They promptly say 'No—the country does not require it; if you make any more there will be a glut; you know nothing about assessing the future demand; look at our long experience, we know how much the market can take up, so leave it all to us.' That is the first phase, as we have experienced it in each case. Then we decide to go ahead just the same, because whether anybody says it or not, everyone knows that the private parties are taking the narrow view, do not have a grasp of the country's needs or even its major objectives; and Government decides to go ahead. At that stage the private parties are again naturally consulted and more than fully consulted, then they tell us: 'if you want to have more, by all means have it; but leave it to us; anyway, you have no experience; Government enterprises will always fail and must fail because you are incompetent and have no incentives for success. We are the experts and professionals in the business and we will make it all for you, but you must guarantee us our capital, our prices, and our profits and protect us also from competition.' Then Government, in the teeth of all these, proceeds to make up its mind and is ready and determined to go ahead just the same, namely, to set up adequate production targets, to set up production in the public sector and to prescribe that the production shall be commercially viable. In other words, the public enterprise must establish itself, must stand, and grow in the full blow of all the winds.

"We have seen these stages in the case of steel and coal and heavy electricals, enterprises vital to the needs of the country. All the advice and assistance we have received from the private sector in these has been negative. In the case of machine tools we are in the third phase. Everyone has now woken up to the fact that the country requires, and must require, large quantities of machine tools of all kinds. The Government experts say so and the private parties not only concede but even affirm it. So now in the third phase there seems to be room for everybody, and plenty for everyone to do, which is exactly what the Ministry of Production has been trying to urge

upon everyone first in the case of coal, then in the case of steel and now in the case of machine tools, not forgetting also, and recently, the heavy electrical equipment. The cost to the country to all this haranguing and arguing is delay, a heavy burden upon the poorest people far longer than is necessary, and a struggle upon each occasion to keep the direction set at least more or less towards the major objectives of a socialistic pattern of society.

"The Hindustan Machine Tools Factory,⁴ like any other factory, must be a commercial concern, and it must pay its way and it must make profits. The management is always on the defensive. The Managing Director constantly brings up what he regards as final undertakings and promises made to the private parties—that the Hindustan Machine Tools will continue indefinitely to manufacture only those things which the private parties will not or cannot make or have tried but failed to make. Attempts to correct this feeling have not produced much change, and today the management feels exactly the same as a year ago. Even the Board of Directors, which, over a series of meetings, has called for a diversified forward production schedule, gives the feeling of being on the defensive. There seems to be a sense of the inevitability of running at a loss, if not failing altogether.

"To the extent that the H.M.T. does not pay its way, and to the extent that it is not allowed to do so, the tax-payer must subsidise it or the Government must go out of business and let somebody else do the job. None of these things need happen. They should certainly not be allowed to happen. The factory should be put on the same basis and at least have the same rights and the same freedom as others have, including the right to have diversified and changing production. It must be allowed to make the so-called 'bread and butter' items. It is these items which are the profit making ones and which provide a broad enough entry into the market and the means of properly serving the market. No factory in the world could pay its way if it is restricted rigidly to producing *one* lathe and of *one* particular dimension, namely, 8½", month after month and year after year, as seems to be the position in the case of the H.M.T.

"The Board of Directors of the H.M.T. is now devising

4. a Government company.

production programmes which will be submitted to Government shortly with the request to be allowed to make not only lathes of different kinds but also drilling machines of different kinds, milling machines, planning machines and so on. The machinery already installed at the H.M.T. is fully adaptable and flexible to enable all these things to be made with only slight changes from time to time.

“The factory of our collaborators, M/s Oerlikons at Zurich, is an example worth considering. It is a large factory, where high specialisation is combined with high diversification under the same roof. They follow sound principles of economic production, namely, they make a large enough number of machine tools and other things; they make short production runs (in other words, they are not committed for this year and next year and the year after to make just 400 lathes of 8½” size or any other size, but they make short runs of 20, 50 or whatever number may suit them from time to time). As the market varies they are able to switch over from one item to another. That is not all. In the same factory they make products as diversified; to give some examples, as machine tools like lathes, drilling machines, milling machines (in each case of several sizes), and then anti-aircraft guns, tabulating machines, dictaphones, teleprinters, and even parts and sub-assemblies for other factories. The result is that the whole factory is fully occupied, the whole capacity is kept flexible, and sufficiently ensured against being put out of production or off balance. It is not suggested that the H.M.T. should make anti-aircraft guns or teleprinters and so on; but it certainly must take on a more diversified and more flexible programme of production, and in doing this it must be sustained by Government, even if it means a certain amount of overlapping and competition with the private sector.”

PART TWO

THE SELECTION OF CONSULTANTS

A Negotiating Committee is Set Up

IN PURSUANCE OF the Government's decision in March 1955 to set up the H.E.E. factory in the public sector and to seek the advice of a committee of Indian electrical experts for the selection of consultants and examination of the scheme, a Negotiating Committee, consisting of representatives of the Ministries of Production, Commerce and Industry, Irrigation and Power, and Railways, the Planning Commission, Delhi State Electricity Board and of some other experts, was appointed. The members of the Committee were: Shri S.S. Khera, Secretary, Ministry of Production, who was the Chairman; Shri A.S. Gadkary, Consultant (Power), Planning Commission; Shri M. Hayath, Member, Central Water and Power Commission; Shri G. Chandy, Chief Electrical Engineer, Mysore; Shri K.N. Ranga Rao, Chairman, Delhi State Electricity Board; Shri B.D. Kalekar, Industrial Adviser (Engineering), Ministry of Commerce and Industry; Shri L.T. Madhani, Joint Director (Mechanical Engineering), Ministry of Railways; Shri B.K. Mitter, Planning Officer, H.E.E. Project; and Shri Saroop Krishen, Deputy Secretary, Ministry of Production. The Committee met for the first time in the Ministry of Production on April 28, 1955 to consider measures for the implementation of the recommendations contained in the report of the Committee on Heavy Electrical Equipment Project, which had been accepted by the Government. One of the specific items considered at the meeting was the procedure for selecting a qualified and experienced firm or firms of electrical manufacturers to collaborate with the Government in the scheme.

The Chairman of the Delhi State Electricity Board suggested that a holding-company should be formed to exercise co-ordination and control over a number of manufacturing units which would specialise in different items or groups of items of production. The existing units should be the nucleus for development. The technical tie-up to the extent necessary should be not with

one firm but with different specialised firms, with experience in the particular lines of production. Shri Gadkary and Shri Hayath pointed out that the question had been considered by the Heavy Electrical Equipment Committee in great detail, which had come to the conclusion that it would not be in the interests of the country to arrange for collaboration with more than one firm and had suggested instead that a single firm should be charged with overall technical responsibility for the entire scheme. Moreover, since the majority of items envisaged for manufacture in the state factory were being manufactured by the larger firms, one of them which might be selected would have no great difficulty in assuming responsibility for the scheme as a whole. There would no doubt be some items in regard to the manufacture of which the firms did not have special experience but for this purpose it should be possible for Government to arrange for subsidiary collaboration in consultation with the main consultant. Such an approach would ensure not only quick results but also that the best standards available would be observed.

Shri Gadkary explained that while reliance on Indian firms would be the keynote of the scheme, the H.E.E. Committee was convinced that technical collaboration with a foreign firm or firms was inescapable at the present stage. It was necessary that India should have the full advantage of research and development in the field in the more advanced countries and that would not be possible without foreign collaboration.

Shri L.T. Madnani pointed out that the past experience of the Ministry of Railways indicated that association with only one major firm would be preferable provided such a course was technically feasible. It would also have to be ensured that such a firm did not have any other interest in India which would conflict with the implementation of the scheme.

The Negotiating Committee decided that instead of primary agreements being entered into with a number of manufacturing firms regarding different items or groups of items of production the aim should be to have as far as possible one primary agreement of collaboration with a single firm which was noted for its experience in the largest number of items, its widespread capacity and competence in the field. Questions relating

to the concentration of the entire production in one unit or more than one unit, the location of the unit or units, and the development of any of the existing units within the framework of the recommendations of the Committee, were postponed for consideration at a later stage, to be dealt with in the light of the advice to be tendered by the consultants.

The Committee then considered two lists of foreign firms: one list of twelve firms which had been prepared in the Ministry of Production on the basis *inter alia* of the interest shown by them in the project in the past, and another list of seven firms suggested at the meeting itself. On the basis of the criteria settled in an earlier discussion it was decided that only eleven of these firms should be asked to make a survey and submit project reports for the establishment of a heavy electrical equipment project in the country. The Committee also gave an indication about the heads under which information should be obtained from the firms chosen.

The Electrical Experts Committee

Subsequently, on June 10, 1955 the Government of India, in the Ministry of Production, appointed a Committee of Electrical Experts for the establishment of a heavy electrical equipment factory. The members of this Committee were: Shri S.A. Gadkary, Consultant (Power), Planning Commission; Shri N.N. Iengar, Technical Adviser, Tata Hydro Agencies Ltd.; and Shri G. Chandu, Chief Electrical Engineer, Government of Mysore. The alternate members selected were: Shri J.L. Disa, Acting Chief Electrical Engineer, Government of Mysore; Shri P.C. Kapur, Chairman, Works Reviewing Committee, Ministry of Railways; Shri K.N. Ranga Rao, Chairman, Delhi State Electricity Board; Shri S.S. Kumar and Shri M. Hayath, Members, Central Water and Power Commission; and Dr. B.D. Kalelkar, Industrial Adviser (Engineering), Ministry of Commerce and Industry.

Shri B.K. Mitter, formerly General Manager of the Hindustan Cables Ltd., and Planning Officer (Heavy Electrical Equipment Project), Ministry of Production, was also associated with the Committee to assist in its work. The terms of reference of the Committee were as follows:

1. To study and report on the offers received in reply

to the letter sent to firms for collaboration in the H.E.E. project;

2. To discuss the offers further with any or all of the firms, if considered necessary, for a comparative study of the offers;
3. To examine the economics of production of the equipment according to the information received from the various firms;
4. To recommend the firm or, if necessary, the firms which should be considered for appointment as technical consultants for the project;
5. To consider in due course and make recommendations on the detailed report submitted by the firm of technical consultants selected; and
6. To give such other advice as the Committee might consider desirable; in particular upon the scheme to be prepared by the technical consultants for the training of technical personnel required for the project.

Out of the 11 firms addressed by the Ministry of Production, only seven firms offered to collaborate. The Electrical Expert Committee considered the reports submitted by these firms, indicating their plans for setting up the H.E.E. factory and terms and conditions of collaboration. The Committee held meetings from June 13 to June 25, 1955 in the Planning Commission, to discuss in detail the terms of collaboration with the representatives of the firms. With the exception of one, all the firms sent their representatives.

The Committee discussed at length the basis for evaluating the merits of each offer, and decided that the factors to be taken into consideration in such an evaluation should be as follows:

- (1) Experience in setting up similar factories in foreign countries.
- (2) International reputation of the firm on the quality of its products.
- (3) Research and development in relation to the products proposed for manufacture in the Indian factory.
- (4) Variety and range of manufacture.
- (5) Reputation in business dealing in India.
- (6) Cost of service involved.

(7) Willingness for financial participation.

The terms offered by each of the seven firms were evaluated on the basis of these criteria and the Committee came to the conclusion that the Government should conduct further negotiations only with three firms indicated by it with a view to entering finally into agreements with only one of them. One of these firms was the A.E.I. The others for purposes of this Case Study may be designated as Firms B and C. There were many variations in the details of the offers made by the three firms selected by the Committee. In order, therefore, to bring out clearly the differences in the scope of services offered and the charges to be paid for, it was decided to elicit further information and the Ministry of Production conducted negotiations with the firms to find out which of them offered the best terms. In this work, the Ministry was assisted by the Joint Secretary of the Ministry of Finance, and the convener of the Electrical Experts Committee, Shri Gadkary.

Quite early in the assessment it was realised that the terms of Firm C were distinctly higher than those of the A.E.I. and Firm B. Hence the terms of Firm B and the A.E.I. alone were compared in detail, as follows:

<i>Item</i>	<i>Firm B</i>	<i>A.E.I.</i>
1. Consultants' fee (in percentage of capital invested)	4.5%	3% subject to a ceiling of Rs. 46.5 lakhs.
2. Procurement of Equipment	The purchase would be on limited tenders from 2 or 3 firms chosen by Firm B which had developed specific designs but was interested in keeping them confidential.	3% on the value of non-standardised equipment. If required to act as purchasing agents, the rate would be 5%.

<i>Item</i>	<i>Firm B</i>	<i>A.E.I.</i>
3. Capital investment	Rs. 10 crores.	Rs. 15.9 crores.
4. Time required for production	First mentioned as 2 years, and later 5 years.	5 years.
5. Annual output (value)	Rs. 10 crores.	Rs. 14 crores.
6. Personnel worked out on an assumed factor of efficiency as between foreign and Indian workers	6,500.	12,200.
7. Service charge	<p>(1) Lump sum payment totalling up to Rs. 29.12 lakhs (free of tax) as the manufacture of different products is undertaken.</p> <p>(2) Service charge on the sales value of the products varying from 3% to 7%, free of Indian income tax. The average service charge was to be 4.5% excluding hydraulic turbines for which the figure was to be 6-7%.</p>	
		<p>2½% of the sales value of the products except hydraulic turbines (subsidiary collaboration) in which the charge would be Rs. 7,500 per year for 2 years and later 5%. This payment would be subject to income tax. The net payment would be about 1½% of the bulk of the products.</p>

<i>Item</i>	<i>Firm B</i>	<i>A.E.I.</i>
	(This meant an additional payment of nearly Rs. 30 lakhs and an annual charge on the sales value of the products of over 4.5% as against about 1½% of the A.E.I.)	
8. Period of contract	Initially 15 years, and again individual licence contracts for different products for another 15 years. If the main contract and individual contracts were to be co-terminus, the period of contract should be 25 years, if the value of the output in the 10th year was less than Rs. 7.5 crores and 20 years if the output in the 10th year was equal to or more than Rs. 7.5 crores.	15 years.
9. Appointment of technical manager and assistant commercial manager	To be nominated by Firm B.	No such condition was specified.

Item	Firm B	A.E.I.
10. Financial participation	<p>(1) The investment of the firm would be limited to the value of electric equipment for the factory ordered from them and would be repayable with interest varying from 3% to 6%.</p> <p>(2) If the value of the shares appreciate in the meanwhile the firm should receive the increased value.</p> <p>(3) Representation on the board of directors of the factory should be given to the firm.</p>	<p>3$\frac{1}{8}$% interest on the loan subject to Indian income tax. The amount would consist of £300,000 taken from the lump-sum payment due to as consultants (£350,000) and 10% of payments made to A.E.I. for 10 years for orders received from India for equipment manufacture in the A.E.I.'s U.K. factories and covered by the manufacturing schedule of the factory.</p>

The Selection of the A.E.I.

These facts and figures were placed before the Negotiating Committee for consideration and decision at its meeting held on July 26, 1955. The Committee considered the various aspects of the problem and decided in favour of the A.E.I. which seemed to offer the most favourable terms.

At this meeting the Negotiating Committee also approved the general outlines of the draft Agreement to be entered into with the A.E.I. The Ministry of Law was generally consulted in the preparation of the heads of the draft Agreement on the understanding that it would examine the matter in greater detail before the Agreement was actually signed.

The draft heads included, *inter alia*, particulars of the

services to be rendered by the technical consultants and the responsibilities attaching to them. They were to make a recommendation on the number of factories to be set up and the location suitable for the same within four months of the signing of the Agreement and further recommendations within six months to enable the Government to start preliminary work on the project, such as training of personnel, arrangements for supply and power and transport facilities. The Agreement, besides, was to provide that the detailed project report, which would be prepared in association with Indian experts and which would include among other items the time schedule for the different stages of the work, should be submitted within 12 months of the signing of the Agreement.

According to the draft Agreement it would be open to the Government to accept the report or to reject it. In case the report was rejected because it was found to be unsatisfactory, the consultants would be paid only reasonable compensation not exceeding the cost of the preparation of the report. If the report was not acted upon for reasons other than the report being unsatisfactory, a sum of £75,000 would have to be paid to the consultants. The consultants would be responsible for ensuring that the time schedule as approved by the Government was duly followed. The consultants were also to agree that the last five instalments of their fee (£60,000 each, totalling £300,000) should be paid to them at different stages related to the progress of the factory. Further, the draft Agreement provided that if the consultants defaulted in a serious degree in the discharge of their duties, the Government could suspend the payment of the instalments still due to them until the default had been rectified, and also receive an amount up to 10% of the total lump sum payment of £350,000 due to the consultants.

The heads of the draft Agreement further provided for the training and association of Indian nationals at all stages of the work from the planning of the factory onwards and for indigenous production of engineering and other industries being used to the maximum possible extent. There was also a provision for earlier termination of the Agreement on six months' notice in case the consultants failed to render technical services or to perform other obligations under the Agreement.

The Negotiating Committee decided that the proposal for

appointing the A.E.I. as consultants for the H.E.E. factory should be presented for the approval of the Union Cabinet with the following remarks:

- (1) The payment of the last instalment of £60,000 out of the total of £350,000 of the consultants' fee should be linked with the first section of the factory being commissioned.
- (2) The provision regarding certain payment being made in pounds sterling and 'free of Indian income tax' should be referred to the Central Board of Revenue for its concurrence.
- (3) Provision should be made for the factory continuing to use the patent rights, etc. for the manufacture of the products after the expiry of the term of the Agreement.
- (4) There should be no restriction on the export of the products of the factory to any country after the expiry of the Agreement.
- (5) In respect of hydraulic turbines, subsidiary collaboration had been proposed by the A.E.I. with a certain firm on specified terms. There should be provision for the Government reserving the right to arrange for collaboration with some other firm if the Government so desired.

The Ministry of Production submitted a note to the Cabinet towards the end of July 1955 giving briefly the conclusions reached by the Negotiating Committee at its meeting held on July 26, 1955 and requesting the approval of the Cabinet to the A.E.I. being appointed as technical consultants for the manufacture of heavy electrical equipment and to an agreement being signed with it, on the basis of heads of Agreement approved by the Ministry.

Soon after, letters, dated July 28-29, 1959, were received in the Ministry of Production from Firm B, offering lower terms. Based on this information a supplementary note was sent to the Cabinet by the Ministry of Production stating that on the whole the reduced terms offered by Firm B did not compare favourably with those of the A.E.I.

A detailed communication giving the comparative estimates of the terms offered by Firm B and the A.E.I. and generally indicating the more favourable terms of A.E.I., was addressed to the Prime Minister by the Minister of Production. The

communication stressed the urgency of arriving at a decision on the choice of the technical consultants without any further delay.

The Reasons for Selection

Early in August 1955, the appropriate committee of the Cabinet considered the proposal of the Negotiating Committee and desired that the Ministry of Irrigation and Power should obtain a clarification from Firm B and the A.E.I. about the difference in the estimates of the annual output given by them. A detailed questionnaire was prepared in the Ministry of Production in order to obtain a clearer statement of the position of the two firms, and sent to Firm B and the A.E.I. on August 22 and August 24, 1955, respectively. Replies to the questionnaire were dispatched by Firm B on August 26, 1955, and the A.E.I. on August 29, 1955.

The clarification regarding the difference in terms offered by the A.E.I. and Firm B so obtained was placed before the Cabinet committee in the middle of September 1955. Along with this, the Ministry of Production submitted a separate note to the Cabinet committee indicating the reasons why the A.E.I. should be preferred to Firm B. The most important reason mentioned was that the A.E.I.'s terms were cheaper than those of Firm B and the A.E.I. was willing for financial participation unconditionally.

The considerations which guided the Ministry of Production in its choice of the A.E.I. as consultants for the H.E.E. factory were several and may be briefly mentioned here.

The first was the A.E.I.'s link with atomic research. The A.E.I. was among the leading groups of firms selected by the U.K. atomic energy authority for developing atomic power stations. Dr. Bhabha, Director of the Department of Atomic Energy in India, had stated that, other things being equal, the A.E.I. should get preference because of this factor. This was an important consideration and the A.E.I. had also offered its co-operation in developing atomic energy power stations in India.

Secondly, in regard to the cost of consultancy and willingness for financial participation, the A.E.I. appeared to offer better terms than Firm B. The A.E.I.'s offer of £300,000 of its consultants' fee, together with 10% of the annual sales value in India of items scheduled for production in the H.E.E. factory

for a period of ten years, which was expected to approximate to about £2 million, was undoubtedly a better proposition than Firm B's offer of 5% of sales value for a period of 12 years together with half of its net service charges.

The A.E.I. had proposed to charge an interest of 3½% subject to income tax (about 1.75% net) while Firm B had asked for 3% interest but free of income tax. Hence, the A.E.I.'s terms were advantageous in this respect also.

In the third place, the differences between the two firms in the cost of constructing the factory and the cost of output of the factory were important considerations in selecting the A.E.I. A comparison of the figures representing the cost of production of the two firms, which was undertaken by the officials of the Ministry of Production, and Shri Hayath, Officer nominated by the Ministry of Irrigation and Power, brought out the following facts:

<i>Items</i>	<i>A.E.I.</i> (Rs. in lakhs)	<i>Firm B</i> (Rs. in lakhs)
Turbines	233.00	220.00
Other items excluding traction equipment	553.00	525.00
Traction equipment (including switch-boards, industrial motor control for items other than traction)	195.21	255.00
TOTAL	981.21	1,000.00

It may be noted that the two figures were very nearly the same.

In respect of cost of the factory output, the figure of Rs. 14 crores given by A.E.I. represented sales value. If the assumed profit of Rs. 210 lakhs was deducted the cost of production would amount to Rs. 11.90 crores. Firm B's estimate of its cost of production was only Rs. 10 crores. The A.E.I. had undertaken to provide for a larger volume of production of certain items such as transformers, traction motors and traction equipment and this clearly accounted for the differences in costs estimated by the two firms.

Fourthly, the estimates pertaining to capital investment estimated by the two firms were as follows:

	<i>Building</i>	<i>Capital Equipment</i>	<i>Total</i>
	(Rs. in crores)	(Rs. in crores)	(Rs. in crores)
Firm B	2.50	7.50	10.00
A.E.I.	5.60	10.30	15.90

Furthermore, Firm B's estimate of the area required for the factory was 1.20 million sq. ft. while that of the A.E.I. was 1.45 million sq. ft. In its report of January-February 1954, Firm B had indicated a figure of 1.317 million sq. ft. As regards the cost of building the factory, Firm B's estimate was Rs. 21 per sq. ft.; and the A.E.I.'s Rs. 39 per sq. ft. The Ministry of Production felt that there was reason to accept the A.E.I.'s figure as more accurate, as experience in the past, for instance in building the Chittaranjan Factory, had shown that the cost would be round about Rs. 35 per sq. ft.

The variation in figure in respect of capital equipment—between Firm B's estimate of Rs. 7.50 crores and the A.E.I.'s of Rs. 10.30 crores—had to be considered along with certain other factors. For one thing the A.E.I. had provided for a larger volume of output. Firm B had provided for more than 600 machine tools; and the A.E.I., for 630 production machine tools plus 70 similar tools for training and maintenance and in addition a larger number of drilling machines, sheet metal working machines, etc. The total output in this respect as of Firm B and the A.E.I. was estimated to be 600 and 900 machines respectively. Then again, the A.E.I. had planned a factory for turning out bigger units with a larger production schedule than was contemplated by Firm B. Finally, it was noted that the capital cost of equipment would be determined by what the Government might have to pay after inviting global tenders with a view to selecting the most favourable terms offered.

As regards the assessment of labour efficiency, the assessment made by Firm B was more favourable to the Indian labour. Its original estimate made in 1954 was that the Indian labour was 50% as efficient as the non-Indian labour in Firm B's own

country. In 1955, it revised the formula and declared that Indian labour was 70% as efficient as the labour force in its country.

As to the comparative position of the two firms in the market, the figures provided by the Director-General of Supplies and Disposals showed that during the two years 1953-54 and 1954-55 the orders placed with the A.E.I. amounted to Rs. 83.45 lakhs against 1.69 lakhs placed with Firm B.

A factor of some consequence that determined the choice of the A.E.I. as against Firm B was the former's superiority in producing traction equipment. This was an important consideration since the state factory was to produce not only hydro-electric turbines but also traction equipment for railways. As regards hydro-electric turbines, it was found that neither of the two firms was manufacturing them in its workshops but had expressed willingness to arrange for collaboration with other firms producing this item. Firm B had an advantage in this respect as it proposed to collaborate with Firm Z₃, a world famous manufacturer of hydro-electric turbines, while the A.E.I. was willing to collaborate with any firm approved by the Government of India.

As to the penalty clause, the A.E.I. was agreeable to forgo about Rs. 4.65 lakhs but Firm B had offered to forgo its entire consultation fee of Rs. 45.50 lakhs in case of default on its part. However, the Ministry of Production pointed out the difficulties inherent in pinning down legal liability for a default. In the past though there had been several cases of default in the Hindustan Shipyard and the Hindustan Machine Tools, it was found difficult to prove the default. The case would therefore have to go for arbitration. The neutral arbitrator in the case of Firm B was to be an authority appointed by the International Chamber of Commerce, while the A.E.I. had agreed to accept a person nominated by the Attorney-General of India. Hence, it was felt that the distinction between the two firms in terms of the penalty offered was unreal.

Lastly, on a review of their respective experience in putting up similar factories elsewhere, it was found that all the factories installed by Firm B were under private management, while the A.E.I. had constructed a Government factory in Soviet Russia—an experience which, it was argued, would be more useful for the

construction of a similar factory in India. Besides, it had already put up a factory in India which was still in operation, and hence it could be expected to have better knowledge of the local conditions.

The Ministry of Production then set forth arguments to show why it was not feasible to ask both the firms to give detailed project reports. It was felt such a solution would not prove to be an adequate answer to the problem of choosing between two firms neither of which had an overall, marked superiority over the other. There would be difficulty in providing basic data for the preparation of project reports to both and in withholding of information regarding one party from the other. Moreover, it would be against all canons of good administration to set two consultants in competition with each other. It would encourage them to produce a rosy picture based on unreal data. The loopholes in such an arrangement would manifest themselves only after the decision was taken to put up the factory. It was quite possible that a situation would be created in which the 'actuals' would have no resemblance whatsoever to the project reports. There would be increasing demand for more land and equipment, which in turn would precipitate a move to scrap the project reports themselves, thus setting the clock back to where the idea of the scheme originated a decade ago. In its note to the Cabinet, sent in mid-September 1956, the Ministry of Production therefore suggested that the proper course would be for the Government to reach a decision as to who should be appointed as consultants.

The Appointment of Consultants

Approval of the Cabinet was granted in September 1955 to the A.E.I. being appointed technical consultants for the manufacture of heavy electrical equipment and to the Agreement being signed with them on the basis of the heads of Agreement, prepared by the Ministry of Production and approved by the Negotiating Committee.

The agreement was signed with the A.E.I. on November 17, 1955. The Agreement, which was for a period of 15 years, provided that the A.E.I. would act as Technical Consultants in the matter of selection of a most suitable site, the preparation of a suitable training scheme, and the establishment, as

expeditiously and economically as circumstances might permit, of an efficient factory in India capable of producing heavy electrical equipment and for advising on all other matters necessary for the successful operation of the factory. It was also agreed that in consideration of the services to be rendered, the Consultants would be paid a sum of £400,000 in suitable instalments spread over a period of nearly six years, i.e., till the factory went into production.

PART THREE

SITING AND LOCATION

The Preliminaries

UNDER THE CONSULTANCY AGREEMENT between the Government of India and the A.E.I., signed on November 17, 1955, the A.E.I. was to act as Consultants to the Government for the "establishment, equipment and operation of one or more factories for the manufacture of heavy electrical equipment", as broadly outlined in the schedule of manufacture given. As a preliminary to the actual construction of the factory, the Consultants had to provide the technical data and render advice to the Government: first, on the number of factories which should be set up; and, secondly, on the site where the factory should be constructed. Within five days of the signing of the Agreement, that is, on November 22, 1955, the Ministry of Production requested all State Governments to send their suggestions about the location of the factory in their respective States, at a site which was regarded by them as most suitable and economic. A questionnaire was prepared by the technical Consultants and was approved by the Government with minor modifications. Originally, it was decided at a conference of the Consultants and the Negotiating Committee that this questionnaire should be sent only to a few selected States as follows:

- (a) Madhya Pradesh, Orissa, West Bengal and Bihar which deserved preference according to reports submitted by the A.E.I. in 1949;
- (b) Andhra, Mysore, Madras and Uttar Pradesh which had sent representations on the subject; and
- (c) Other States which had been constituted since 1949 and which merited consideration. (Hyderabad and Travancore-Cochin had also sent representations but it was decided that owing to their distance from the raw materials the location of the factory there would be comparatively uneconomic.)

However, the Minister of Defence and the Minister of Home Affairs suggested that the questionnaire should be sent to all the

States and this was accordingly done. Twenty States and Union Territories responded to the questionnaire, while the following seven replied that they did not wish to be considered: Ajmer, Coorg, Delhi, Kutch, Manipur, Saurashtra, and Tripura.

In the meantime, a meeting of the Negotiating Committee was held on November 28, 1955. The Committee felt that the two matters which called for urgent consideration were the location of the factory and the preparation of a suitable training scheme.

As regards location, the Negotiating Committee thought that it would be an advantage for the Indian experts not only to examine the material to be received from the State Governments urging the location of the factory in their respective States, in response to the questionnaire already issued to them, but also to indicate broadly the criteria for the selection of the site. Moreover, the Indian experts should work in close co-ordination with the foreign experts, so as to be able to assess realistically the recommendations of the Consultants at a later stage.

The Committee also discussed broadly the policy of the Government regarding location of heavy industries. It was suggested that, besides strictly economic and technical considerations, the Government might take into account considerations such as regionalisation of industries and their strategic dispersal. The consensus of opinion was that the technical Consultants should recommend three or four probable sites for the location of the factory, based purely on economic and technical factors and that the Government should then make a choice from these, after giving due weightage to considerations like dispersal of industries.

The replies to the questionnaire were examined by the Consultants, and after taking into account the economic factors for the establishment of a heavy electrical equipment factory, including soil, transport facilities, climate, water supply and electricity, they made a preliminary selection of fourteen States which appeared to offer suitable sites. The other six States, namely, Assam, Himachal Pradesh, Pepsu, Pondicherry, Punjab, and Rajasthan, were accordingly excluded from further consideration.

The experts appointed by the A.E.I. arrived in India in the first week of December 1955. After holding consultations with

the officials of the Ministry of Production, they set out on an inspection tour of the sites in the following 14 States: Andhra, Bihar, Bhopal, Bombay, Hyderabad-Deccan, Madhya Bharat, Madhya Pradesh, Madras, Mysore, Orissa, Travancore-Cochin, Uttar Pradesh, Vindhya Pradesh, and West Bengal. They were accompanied by Indian experts, Shri Gadkary and Shri Azad.

Where more than one site had been offered, the State was requested to indicate the most suitable site and the experience of the visiting experts was made available to facilitate the choice by the State of its best site.

The Case for a Single Factory

The Consultants, after a consideration of the question of establishing one or more factories, came to the conclusion that there should be one factory only in the first stage of the project. They felt that economic production in the shortest possible time, with the lowest practicable capital expenditure, would be possible only with one factory. In this, they took into consideration the shortage of qualified and experienced engineers and managerial staff required to operate more than one factory and the increased capital expenditure on water supply, drainage, electricity and other items involved in setting up more than one undertaking. They were also of the opinion that the output planned could be produced conveniently from one central factory. The Ministry of Production agreed with the Consultants' recommendation that only one factory should be established in the first stage of the project.

CRITERIA FOR SITE SELECTION

In looking for a suitable site, the Consultants laid down certain ideal conditions. Briefly these were:

- (1) The site chosen should be such, topographically as well as geologically, as would enable the construction of heavy engineering workshops, containing cranes up to 120 tons capacity and other types of heavy machine tools, without having to spend exorbitant sums on foundations. The site, besides, should be level so as to avoid extensive levelling operations or the need for erecting buildings at different levels.

- (2) The site must also be extensive enough to provide for a township, say of 60,000-70,000 inhabitants, to house and supply the workers. Above all, the site as a whole must be free from danger of floods and be capable of being adequately drained of both sewage and storm water.
- (3) Another vital requirement was an adequate supply of water, which should be available in sufficient quantities to meet the requirements of both the factory and township. There must be guarantee of a maximum supply of 25 cusecs ultimately, even though the project and township would initially require only 15 cusecs.
- (4) The factory should be so situated as to enable supplies of raw materials both indigenous and imported to be made available to the factory at the lowest possible transport cost. The ideal location which would facilitate this would be one situated at a distance of about 50 miles from steel works supplying billets, bars, sections and sheet steel, and within more or less the same distance of collieries supplying both steam and coking coal.

Care should also be taken to see that the site was within easy reach of supplies of all other indigenous goods needed as well as part-manufactured goods, such as nuts, bolts, rivets, hand tools, wires, cables, textile fabrics and tapes, paints and varnishes. As much of the materials would have to be imported, easy accessibility to a good port capable of handling the goods imported would be an essential requirement at least during the early stages of construction of the factory. This, in turn, would mean that the site should be adjacent to a main railway line, having the capacity to handle the extra loading and providing direct links with collieries, steel producing areas, and a good port.

- (5) Transport facilities capable of handling factory output of the order of 15,000 tons a year initially, rising at peak production to 30,000 tons a year, would be an essential requisite. Besides, these lines should be capable of carrying a maximum indivisible load of 110

tons. This in itself would narrow down the choice of the site to an area along a main railway line with connections to all parts of India.

- (6) Power supply of the order of 5,000 KW should be made available for the factory if possible, and an extra supply of 500 KW for the township.
- (7) A telephone system for establishing communications with the rest of the country must be made available at the factory site. Hence, it would be desirable to establish it near a trunk telephone system.
- (8) In establishing a factory of the type contemplated, adequate attention should be paid to climatic conditions. The temperature should not be so high as to have an adverse effect on the ability of the worker to put in the maximum effort possible. Violent fluctuations in temperature from day to night should be avoided as these would cause difficulties with condensation and accurate dimensions. High humidity should also be avoided, as it might cause the breakdown of insulation of high voltage equipment under test or storage conditions.
- (9) The factory should not be set up in a place which is undesirable from the point of view of health. In other words, the site should be free from malaria and other diseases.
- (10) The site should be in an area not liable to suffer from famine conditions; and there should be an adequate supply of food available to meet the needs of the large number of workers required for the factory.
- (11) An important factor to be borne in mind was to avoid conglomerations of heavy industrial units. The heavy electrical equipment should be so situated that there was no danger of local labour being drawn away to other large projects in the same vicinity. Hence, the factory should not be located in the same region as a steel factory or some such large industrial undertaking. The "manufacture of heavy electrical equipment required a different attitude of mind in the workers to that in a steel works". Besides, the work practices differed from industry to industry and, therefore,

care should be taken to see that no unsuitable practices were introduced into the factory. It was also undesirable that trained hands should be lost from the heavy electrical equipment project to other employments, as that would involve a gross wastage of the expensive training imparted to them.

- (12) The site should be within the easy reach of a centre of engineering education, with facilities for lectures and meetings of professional institutions. That would enable the professional engineers employed in the factory to keep in touch with recent trends and progress in the technology of their specialisation. This factor was all the more important in the case of equipment designers and production methods engineers.

Thus, it was obvious that the ideal site for such a factory would be one where a major railway line existed near to a major source of water supply; where steel works and collieries capable of supplying both steam and coking coal existed within 50 miles of the site; where the site was sufficiently far away from existing major industries to minimise the danger of a considerable interchange of workers; and where the site was within easy access of one of the existing large centres of engineering with university and technical education facilities and active professional engineering institutions.

On a review of the possible areas in India where all the ideal conditions could be expected to be combined in a most satisfactory form, the Consultants concluded that the ideal site would be situated in north-eastern India in the regions of West Bengal, southern Bihar, or northern Orissa. They further felt that the farther the site was from this 'preferred area' the more difficult it would be to obtain a satisfactory combination of all the factors, even though individual conditions on 'an improved scale' might be available. For instance, they pointed out, sites nearer the West Coast had the definite advantage of having the superior port facilities of Bombay as well as easy access to educational centres, but sites on the East Coast would be preferable because of their proximity to the port facilities of Calcutta and Visakhapatnam together with the easy accessibility to centres of production of essential raw material like

coal and steel.

It may be noted here that of the sites offered by State Governments, three were in the 'preferred area', namely, Durgapur in West Bengal, Sambalpur in Orissa, and Barka Khana in Bihar.

However, it was decided to survey all the fourteen sites proposed by the States before deciding on any site.

SITE INSPECTION AND SURVEY

During their inspection of the sites, the experts paid special attention to the nature of the terrain, position of nullahs and water supply, communications, climatic conditions, problems of sanitation, availability of raw materials, supply of labour and factors relating to the distribution of the products of the factory. Full opportunity was accorded to each State to present its case and to put forward all favourable factors concerning the site offered by it. The questionnaire and the answers of the State Governments were discussed with their representatives and where the information supplied was considered inadequate, further information was obtained.

The fourteen sites inspected by the technical experts were divided into four groups according to their location. The first group consisted of the three sites in the 'preferred area', the second group was made up of another three sites to the west of the 'preferred area'. Group three included three sites still farther to the west of the 'preferred area'. The fourth group comprised sites located in the southern region of India.

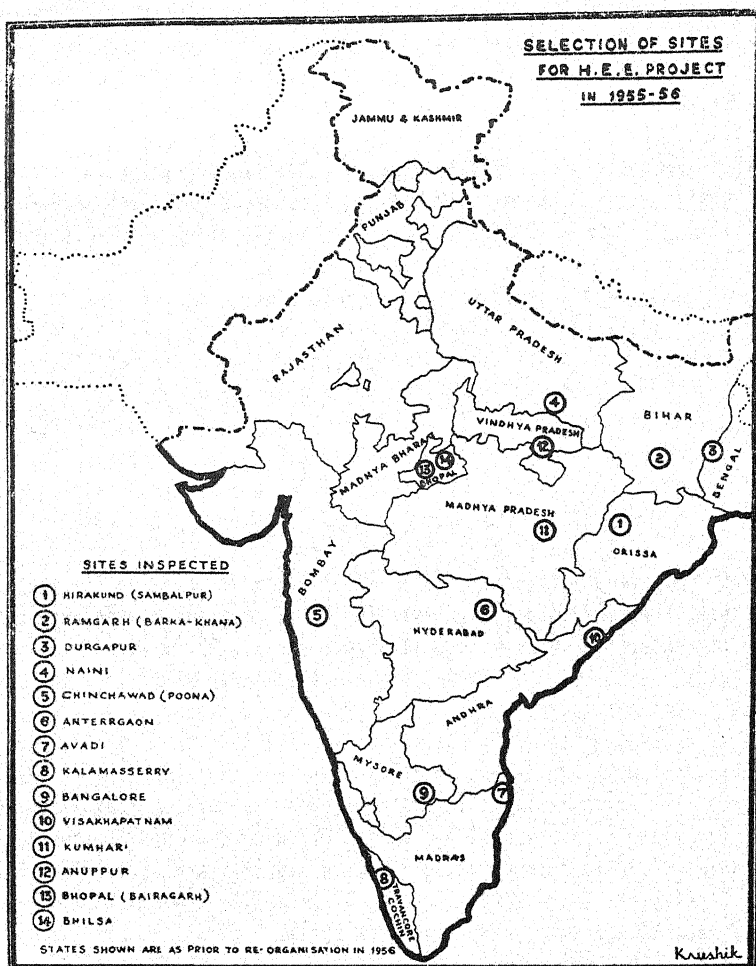
The report of the Consultants furnished detailed information regarding each of the 14 sites visited. Briefly, the information collected by them was as follows:

GROUP ONE

(1) *Durgapur in West Bengal*

Durgapur lies to the south of the Calcutta-Delhi Grand Trunk Road and is flanked on the east and west by roads leading to the Durgapur Station.

The ground is covered by sal trees, hence the level of the ground could not be easily gauged. The land appears to be level



in the north of the site but is broken by fissures in the south. The land sloped considerably on the southern side. The soil is a mixture of sand and murum. The bearing capacity of the soil is estimated as 1.5 tons per sq. ft.

The rainfall in this area is high, the temperature is reasonable but the humidity is fairly high in the wet season. The site is not free from malaria. It is also subject to cyclones, being within the tail end of the cyclone area and only 250 ft. above sea level.

Ample supply of water and power would be available from the Damodar Valley river projects. It is also found that the natural slope of the land towards the river would provide easy drainage facilities for storm water and other effluent discharge.

The area has good telephone connections with Calcutta and Delhi. It is a surplus area in regard to food supplies. Cheap labour is also available, though sixty per cent of it comes from Bihar and Orissa and the rest from West Bengal.

The area is mainly covered by forests. This would raise the cost of ground preparation. Moreover a steel plant, a thermal power station, a chemical plant, and coke ovens are proposed to be constructed in and around the area.

(2) Sambalpur in Orissa

Sambalpur is situated on the bank of the river Mahanadi, just seven miles from the Hirakud Dam. The soil is mainly murum and is subject to flooding from the river. However, on completion of the Hirakud Dam this land would be free from flood water. The maximum foundation bearing pressure of the land is estimated to be 2.5 tons per sq. ft.

The site is about 525/550 ft. above sea level, and lies in a river valley surrounded by hills. The climate tends to be hot but is healthy. The incidence of malaria is also negligible.

This area is adjacent to the Bombay-Calcutta road, which is capable of carrying an axle load of 11 tons. There are other roads too, connecting the Hirakud Project and other villages in the area. It is connected by rail to the Calcutta-Nagpur-Bombay line, at Jharsuguda from where a broad gauge line runs to Sambalpur.

Sufficient water supply is available from the river Mahanadi and power from the Hirakud Project. Besides, the natural fall

of the land would provide gravity drainage for sewage and storm water.

As regards telephone connection, Sambalpur is already linked with Hirakud Dam Project. The site is a surplus area with regard to food supplies.

Sufficient unskilled labour is available in the area. Besides, the site is covered by light jungle growth and could, therefore, be easily cleared, though a considerable amount of levelling work would have to be undertaken. The area is a pleasant country district, but is not within easy reach of any large town. The land is mainly agricultural, so it is possible to reserve sufficient area for the factory and township. The rainfall is rather high.

(3) *Barka Khana in Bihar*

Barka Khana in Bihar is about one mile west of the Ramgarh Cantonment area and twenty-three miles from Ranchi. The site is on the whole flat but slopes gently from south-west to north-west, and has a fall of about 30 ft. to the Damodar river. The surface soil consists of hard murum overlaying granite and gneiss.

The pressure bearing capacity of the soil is estimated at 3 tons per sq. ft. The site has a moderate climate and is about 1,050 ft. above sea level.

Access exists by road to Ranchi, North Bengal and Assam. The site is also at the junction of the East-Indian and Bengal-Nagpur railway systems which meet at Barka Khana Station. A line also links this site with Rourkela.

The water supply comes from the Damodar river which falls as low as 5 cusecs during the dry season. Power would be available in plenty from the Damodar Valley Corporation grid near the site.

The nullahs to the east and west of the site would provide natural drainage for storm water and effluent discharge. There are trunk telephone services at Barka Khana and Ramgarh. The area is surplus in food supply and has a sufficient pool of unskilled workers. The area has a healthy climate also.

GROUP TWO

The Consultants surveyed three more sites to the west of the

'preferred area'—Naini in Uttar Pradesh, Anuppur Sangham in Vindhya Pradesh, and Kumhari in Madhya Pradesh, and reported as follows:

(4) *Naini in Uttar Pradesh*

Naini is situated about five miles south-east of Allahabad. The river Ganges flows on the north-east part of this site. It is bounded on the south-west by the main highway from Allahabad to Mirzapur and the Northern Railway from Delhi to Calcutta.

The terrain is on the whole level with a few projections and tanks scattered here and there. The whole area extending to about ten miles is mainly agricultural land. Land, though cheap, is occupied by agriculturists. Some money would have to be spent on compensation and replacement of villages in order to secure this land.

The climatic conditions are not very favourable as summer temperature is high and winter temperature low. Humidity during monsoons is 100% and annual rainfall 54 inches. The area is about 390 ft. above sea level.

A connecting link of $2/3$ miles would be required to connect the site to Naini Station.

Supply of water could be obtained in sufficient quantity from the Ganges and power from the Rihand hydro-project.

The area being flat, deep drainage would be required for the removal of sewage and storm water. Telephone services are adequate. The area is also marked 'surplus' in food supply.

(5) *Anuppur Sangham in Vindhya Pradesh¹*

Anuppur Sangham is situated at a spot which is 114 miles from Katni and 93 miles from Bilaspur. The land chosen for the factory has a fall of $4/5$ ft. to the river. The land is under dry cultivation and would need a good deal of levelling. The soil formation consists of very light clay $15/20$ ft. deep and a further $15/20$ ft. of murum, overlaying a bed of soft sandstone. The bearing capacity of the soil is .75 tons per sq. ft.

The area is situated at a height of 1,600 ft. above sea level and has an annual rainfall of 45 inches. The temperature is not too hot, the humidity is low except during the monsoons.

1. A part of Madhya Pradesh after re-organisation of States in 1956.

The area has a malaria incidence of 10/20%.

The nearest trunk road passes through Rewa about 136 miles from this spot. The eastern broad gauge single track line from Bilaspur to Katni passes very close to this site.

The river Tipan provides the water supply for the area. With the help of a dam it would provide sufficient water needed by the factory. The newly-sanctioned Burhar Thermal Station could supply the power needed.

Drainage would have to be constructed leading to the river Sone or Tipan.

The nearest telephone system is in Shahdol, thirty-six miles away from the site. The area has a surplus supply of food, and there is also a sufficient supply of unskilled labour.

The area chosen for the factory is within the angle formed by the confluence of the rivers Sone and Tipan. The land is 100% privately owned and 25% of the land consists of forests. The privately owned land is under cultivation, producing paddy and other cereals. The land lies within one of the rice bowls of India.

The sea port of Calcutta is only 530 miles away and that of Visakhapatnam 427 miles. The nearest civil airport is at Nagpur.

(6) *Kumhari in Madhya Pradesh*

Kumhari is situated six miles from Raipur and seven miles east of Bhilai and is to the north of the national highway running from Calcutta to Bombay.

The site is on the whole level. The surface soil is hard murum, extending to an average depth of 2 ft., ending on a layer of hard sandstone. The estimated pressure bearing capacity is 3 tons per sq. ft.

The land is about 950 ft. above sea level. The temperature is high with low humidity. But during the monsoons the temperature falls and consequently the humidity rises. The average rainfall is 52 inches.

Rail tracks to connect Bhilai and Kumhari are planned for construction in the immediate future.

The water supply would come from river Kharun about two miles from the site. The flow falls to about 2.5 cusecs in summer. A dam on the river could solve this problem. Water

could also be got from the existing Mahanadi and Tondula canals. Power is available from the Raipur-Durg line passing across the site.

The site is high lying; so gravity drainage for storm water and effluent discharge would have to be constructed.

A trunk telephone line passes through the site. It is a surplus area in food supply. A large potential of labour exists in the area. However, Bhilai steel works which is situated nearby would require a labour force of 40,000.

The land selected for the factory is Government-owned and could be got free of cost.

GROUP THREE

Still farther to the west of the 'preferred area' another group of three sites was inspected. They were Bairagarh in Bhopal, Bhilsa in Madhya Bharat, and Antergaon in Northern Hyderabad.

(7) *Bairagarh in Bhopal (Madhya Pradesh)*

Bairagarh in Bhopal is about five miles from the capital city of Bhopal. The site chosen for the factory is fairly level and has a fall of 15 ft. to the north. It is bordered on the east by a hill range rising to about 300 ft. high. The ground consists of agricultural soil to a depth of five feet, overlaying soft murum. The estimated bearing pressure is 1 to 1.5 tons per sq. ft.

The site is situated at a height of 1,617 ft. above sea level. The temperature is moderate and humidity low except during the wet months, the average minimum temperature during the winter months being 50°F and the average rainfall 45 inches. Malaria incidence is almost negligible.

The Indore-Bhopal road passes very close to the site and there is a railway line at a distance of two miles from this area.

The water supply for the area comes from a lake having about 8 sq. miles surface area and minimum depth of 50 ft. Power supply could be had from the Bhopal Thermal Station. Additional power is available from Indore, about 120 miles from the spot, which is supplied from the Chambal hydro station. A new hydro station is planned on the river Tawa, only 75 miles from the site.

Natural gravity drainage would provide an outlet to storm water and sewage effluence.

The nearest trunk telephone line is at Bhopal. The area has also a surplus supply of food. The labour potential is also considerably high on this site.

The nearest town is Bhopal which is pleasantly situated among hills on the banks of the Bhopal lake. The nearest port is Bombay, which is at a distance of 480 miles. An airport exists at Bairagarh only five miles from the site.

The factory site which extends to about 5 sq. miles is 5% Government-owned and is mostly barren land.

(8) *Bhilsa in Madhya Pradesh*

The site at Bhilsa lies in the area between the Bombay-Delhi railway line and the Betwa river. The site is reasonably level with a gentle slope of 4/5 ft. westwards to the river Betwa. It is agricultural land with soft soil to a depth of 10 ft. followed by 4 ft. of clay. There is a further 4 ft. of murum overlaying soft sandstone. The estimated minimum bearing pressure of the foundation is .75 tons per sq. ft.

The site is at a height of 1,400 ft. above sea level. It gets a fairly heavy rainfall of 60 inches per annum. The temperature does not rise very high in summer and in winter the site has a comparatively low average maximum temperature. The incidence of malaria is low.

About hundred miles from Bhilsa is the Agra-Bombay Grand Trunk highway. Bhilsa is also on the Central Railway on the Delhi-Bombay line.

The river Betwa flows in northward direction about one mile east of the site. The flow of the water in the river is below 15 cusecs for 90 days and for 20 days there is no surface water. An irrigation dam is planned to be constructed in the area and this would provide sufficient water for the factory. The source of power supply, which appears to be sufficient enough, is the Chambal hydro station.

Gravity drainage to the Betwa river would be easily constructed to remove storm water and sewage.

A trunk telephone exists at Bhilsa. The area has a surplus in food supply. There is more than sufficient supply of unskilled labour in the district.

The nearest airport is at Bairagarh. Bhilsa is about 573 miles from Bombay and 946 miles from Calcutta.

The land is privately owned and would have to be acquired by the Government for the construction of the factory.

(9) *Antergaon in Northern Hyderabad*

Antergaon is near Ramagundam Station on the Hyderabad-Nagpur railway. It is at a distance of 140 miles north-east of Hyderabad and 60 miles north of Warangal.

The site chosen is about 20 sq. miles in extent and is bounded on the north by river Godavari, on the east by the railway, and ringed by low hills to the south and west. The land is gently undulating with a fall of 50 ft. to the river. The ground formation is hard murum with underlaying sandstone at a depth of 5/10 ft. The estimated bearing pressure is $2/3$ tons per sq. ft.

The site is located at a height of 520 ft. above sea level. The average rainfall is 41.11 inches. It tends to be very hot and dry during the summer months, i.e., March to June. The district is free from malaria and on the whole healthy.

The main highway near the site is the highway from Hyderabad. The nearest railway station is Ramagundam about $2/3$ miles from the site.

The Godavari river flows within a mile of the site; ample supply of water is available from it. Power in sufficient quantity is available from the Thermal Power Station at Ramagundam.

Gravity drainage for storm water and sewage is practicable with a discharge to the Godavari river.

A trunk telephone line will be available on the site. The area is also surplus in food supply. Besides, a sufficient pool of semi-skilled and unskilled labour is available.

The site land is Government owned and non-agricultural. The natural port is Visakhapatnam which is 389 miles away by rail. The area has been reserved for industrial development and has good facilities for power, water and transport. The land for the township and factory would be provided free by the State. Coal deposits are found north of Ramagundam.

GROUP FOUR

In addition to these sites five more sites were inspected by

the Consultants and the Indian team of experts accompanying them. These were: Chinchawad near Poona, Visakhapatnam (in Andhra), Avadi (in Madras), Bangalore, and Kallamassery (in Travancore-Cochin.)

(10) *Chinchawad Near Poona*

Chinchawad is situated at a distance of 9-10 miles from Poona, and is adjacent to, and north-east of, the old Poona-Bombay road. To the north-east of the site is the Pavna river, and to the south-east the Mula river. The ground is reasonably level, with a fall of 15 ft. to the Pavna river. It consists of soil and murum to the depth of 4/5 ft. with underlying deccan trap. The estimated bearing capacity for foundation is 2/3 tons per sq. ft.

The site is at a height of 1,850 ft. above sea level. Rainfall is scarce and the temperature range is not extreme. The district has a dry and healthy climate.

The broad gauge Central Railway line from Bombay to Poona lies to the north-east of the site, on the opposite side of the river Pavna. To this river a dam could be constructed at Adha to provide the water supply necessary for the factory. Power supply could be obtained from the sub-station at Kirkee on the Bombay Electric Grid, a distance of four miles from the site. By 1960 electricity would also be available from the Koyna hydro-electric scheme and the thermal station.

Gravity drainage for storm water and sewage would be practicable on this site.

A trunk telephone line runs from Bombay to Poona from which circuits could be provided to the site. The State is deficient in cereals and pulses, though other food items are available in surplus. There is an adequate supply of 'intelligent' labour force in the area.

(11) *Visakhapatnam in Andhra*

The site in Visakhapatnam is adjacent to and north of the Visakhapatnam-Madras trunk road.

The site is located in a wide flat plain broken by small isolated hills. The plain varies from a height of 50 to 100 ft. above sea level. The river Narava Gedda flows through this region and the areas near it are liable to flooding. The formation

of the ground consists of murum and gravel, lying above soft stone to a depth of 15/20 ft. beyond which is granite. The estimated bearing capacity of the soil is 3 tons per sq. ft.

The climate is fairly hot with a high humidity. The average rainfall is 38 inches.

The Calcutta-Madras main railway line runs within 2/3 miles of the site.

There is a water supply scheme under construction which will provide 7.5 cusecs of water. To provide water for the factory and township a dam will have to be constructed on the Gosthani river, 38 miles away. Power will be available in sufficient quantity from the Machkund hydro station. Gravity drainage to carry the effluent discharge to the Narava Gedda river is possible.

A trunk telephone system exists in Visakhapatnam. The area is surplus in food supply. Plenty of unskilled and semi-skilled labour is available.

Visakhapatnam has a natural harbour capable of berthing vessels of 16,000 tons. An airport also exists just two miles from the site.

(12) *Avadi (Madras)*

Avadi is located at a distance of 13 miles west of Madras City. There is no level site of sufficient area for the factory. The whole area consists of reasonably flat portions with depressions in which tanks have formed. The formation of the ground is 1 ft. sand and murum, below which is 15/20 ft. of loam, lying on soft sandstone.

The district has a hot climate with high humidity in the mornings. The area is subject to cyclones.

The site is linked with Madras by good roads. The railway stations of Avadi and Pattabhiram on the Southern Railway broad gauge line from Madras to Arkonam are within two miles of the site.

Water supply comes from the Kottaiyar river, the Cholarearum channel and the Cooum river. Water will also be available from the Pindi reservoir and Arani reservoir. Power supply comes from the Avadi 33 KV sub-station.

Gravity drainage is possible to carry away the storm water and effluent discharge.

A trunk telephone system exists at Avadi. The area is surplus in food supply. Both semi-skilled and unskilled labour are available. The nearest airport is only 22 miles away at Meenambakam. There is also an unused air strip close to the site.

The area which is two-thirds forest and owned by the State is occupied by the Military. But it was confirmed that an area of 5 sq. miles near Avadi could be made available.

(13) *Bangalore*

The site in Mysore State is located at a distance of seven miles north of Bangalore City. The district is gently undulating in a series of ridges, with low hills in places consisting of outcrops of granite. There is sufficient area for a factory site, fairly level with a fall of 10/15 ft. to the south-west leading to a depression. The ground consists of 3 ft. of soil and murum, with a further 3 ft. of gravelly murum, overlaying a partly decomposed soft rock. Below it is granite. The land is covered by scrub jungle growth and plantations of deciduous trees. The estimated bearing pressure of the soil is two-thirds of a ton per sq. ft.

The site is at a height of 3,000 ft. above sea level. The temperature is low and the average rainfall is 34 inches.

The site is linked with Bangalore by means of good standard roads. Jalahalli which is the terminus of the broad gauge branch line is only three miles from the site.

Water is rather scarce but arrangements could be made to obtain sufficient quantities of it from the river Cauvery which is 40 miles from Bangalore. Power in plenty could be obtained from the Rajajinagar grid station at Bangalore.

The factory site is on a small elevated plateau and therefore drainage will be by gravity.

There is a trunk telephone system at Bangalore. The State has a 10% deficiency in rice crop, but large irrigational schemes under construction would change the situation. Labour supply is also adequate. Facilities exist for training also.

The nearest airport is in Bangalore, only six miles away. One-third of the site land is owned by the Government; the rest would have to be acquired.

(14) *Kallamassery in Travancore-Cochin*

Kallamassery is 12 miles north of Cochin, and four miles

south of Alwaye, adjacent to the east of the Cochin-Madras roadway.

The district proposed for the factory and township is undulating with low hills rising to 40/50 ft. above sea level. The plains between the district and the sea, and in the delta of the river Periyar, are only a few feet above sea level and are subject to flooding. A ridge area exists nearby which could provide 250 acres of land having a variation in level of 20 ft. The subsoil consists of an average thickness of 20 ft. of laterite or granite. The bearing capacity is estimated at $\frac{2}{3}$ of a ton per sq. ft.

The district has a moist climate with a low variation of temperature throughout the year. The humidity is high and at times reaches saturation point. The rainfall is heavy, above 120 inches annually. There is no incidence of malaria, but there is high incidence of elephantiasis in the area, which is, however, under control as a result of a campaign started by the Government to combat it.

The Madras-Cochin broad gauge railway line passes within three-fourths of a mile from the site. Ample water supply is available from the Periyar river which is only half a mile from the site. Power supply also is available in adequate quantity. Gravity drainage for storm water and sewage is practicable. There is a trunk telephone line connecting Cochin and Alwaye. The district has a surplus supply of food. Semi-skilled labour is available in sufficient quantity. The factory site offered, which is approximately 100 acres, is Government owned land.

A tabular statement giving details regarding the different sites visited will be found at Appendix II.

* * *

Questions in Parliament

On February 25, 1956 questions were asked in Parliament regarding the heavy electrical equipment factory. Seven members requested the Minister of Production to provide information on the following points:

- “(a) The text of the agreement entered into with a British company for the manufacture of heavy electrical equipment.

- (b) Will the project be completed during the Second Five Year Plan? and
- (c) Whether any of the items proposed to be manufactured are those which are already being manufactured in the country?"

The answer to the questions was given by the Deputy Minister of Production. He pointed out that copies of the Agreement had already been placed in the Parliament Library. The factory, he said, was expected to commence production within five years and to go into full production seven years thereafter. As regards the manufacture of items already in production in the private sector, the intention of the Government was to leave these out. It was further stated that the foreign exchange component of the scheme would be of the order of Rs. 10-15 crores and that the factory would be completely Government owned.

Shri R. Velayudhan (Independent) enquired whether the Government had conducted consultations with any other countries to set up the project within a shorter time. In reply, the Deputy Minister of Production stated that the decision in favour of the A.E.I. had been taken after considerable thought and negotiation and that offers had been received from about a dozen competitors who were prepared to help in the matter.

Dr. Ram Subhag Singh (Congress) asked whether the British firm had been given freedom to choose the site of the factory. To this, the Deputy Minister replied that the Consultants had gone round the country to survey 14 sites suggested by the States but it was left to the Government to take a final decision on their recommendations regarding the suitable sites.

Another member, Shri K.K. Basu, wanted to know whether the equipment necessary for the factory would be got from the Consultants or on the basis of global tenders. He was informed that orders would be placed after inviting global tenders.

Smt. Tarkeshwari Sinha (Congress) asked whether, "soon after the expert committee of the Government of India and the British firm of the Associated Electrical Industries visited Ramagundam in Hyderabad State, the Hyderabad Government had constructed or started setting up a thermal power station and also whether, in view of that fact, the location of the factory had already been decided?" The Deputy Minister replied that

he was not aware of any details regarding the particular location.

REVIEW OF SITES

The inspection of the 14 sites was conducted over a period of eight weeks, from the second week of December 1955 to the first week of February 1956.

After collecting all the information regarding the 14 sites offered by the States, the Consultants evaluated the comparative advantages of each of them as follows:

The First Group

As regards the first group of sites, in the Consultants' considered opinion the *Durgapur* site was satisfactory, as it fully met ideal conditions nos. 2, 3, 4, 5, 6, 7, 8, 9 and 11, laid down by the Consultants (listed at pp. 82-85). The actual site chosen, however, was not the ideal available in the area. It had certain overwhelming disadvantages which could reverse the decision in its favour made on the basis of other factors. A major disadvantage was its proximity to a major steel project, coke oven plant and other major industries planned for immediate development within close vicinity of this site. Such a development, it was feared, would, besides affecting the cleanliness of the atmosphere, prejudice the labour situation in the area.

The *Sambalpur* area satisfied conditions nos. 2, 3, 4, 6, 8, 9 and 11 but the actual site offered was not ideal for the construction of the factory. However, the Consultants were of the view that another site could be found in this area which would satisfy condition no. 1 also. This area, like *Durgapur*, suffered from the disadvantage of having several metallurgical industries which were being planned in the immediate vicinity of any possible sites. It would have to be left out to avoid conflicts that might arise owing to the labour situation.

The Consultants pronounced the site at *Barka Khana* as the best of the 14 sites inspected. The only drawback was in regard to an adequate flow of water supply during the dry season. But this defect, they felt, could be overcome with a certain amount of capital expenditure. A water supply scheme was already in 'blue print' and the State authorities had

estimated its cost at Rs. 97.5 lakhs of which, the Consultants suggested, Rs. 30 lakhs to 35 lakhs only should be charged to the project and the remainder should be borne by irrigation requirements. Since the site satisfied all the conditions adequately, the Consultants felt it would be ideal for the establishment of the heavy electrical equipment project. They, however, added that the establishment of any other major industry within a distance of 30 to 50 miles of the chosen site in the future would prove to be a definite disadvantage and the site would lose its existing utility value.

The Second Group

Coming to the second group of sites, the Consultants were of the view that *Naini*, being situated on the Gangetic plain where the ground soil was entirely alluvial, would have to be specially prepared to lay the foundation for the project, which would mean extra cost. Even had this not been so, the site was unsuitable because it lay in a well-populated area in one of the most fertile regions of India, and hence would pose tremendous problems of resettlement both in terms of money and time. The Consultants estimated that over 20 villages might have to be resettled and the problem of finding and paying for the development of alternative land would be prohibitive. They added that though the site satisfied conditions nos. 2, 3, 4, 5, 6, 8, 9 and 10 reasonably well, it was very inferior in terms of conditions nos. 1, 7, and 11.

Anuppur Sangham was ruled out by the Consultants, being unsatisfactory in a number of respects. Considerable capital expenditure, it was estimated, would have to be involved in bridging the Tipan river to provide proper road connection. A fairly large sum would also have to be expended to ensure an adequate supply of water needed on the site. Further, the nature of the ground was not what could be termed ideal for the construction of heavy buildings and foundations. Hence, the Consultants felt that though conditions nos. 2, 3, 4, 5, 6, 7, 8, 9 and 10 could be reasonably well satisfied by this site, it would have to be ruled out because capital expenditure necessary on it would far exceed the estimates on the other sites.

The Consultants regarded *Kumhari* as an excellent site in many respects, and declared it as the best of the three sites

inspected in the second group. It fulfilled conditions nos. 1, 3, 4, 5, 6, 7, 8 and 9 adequately. The site, however, was too near the Bhilai Steel plant: this would mean difficulties in obtaining adequate quantities of water, which would be needed in large quantities for the steel plant, and would therefore involve incurring of extra capital expenditure. Besides, the presence of a steel plant so near would prejudice the labour situation.

The Third Group

As regards the third group of sites surveyed, the Consultants reported that all sites in this group necessarily suffered from the disadvantages of greater distance from supplies of coal, steel and other indigenous supplies and longer railway links with the consequent risks of delay in transport and increased costs. "Nevertheless", they added, "there are compensating advantages at two of the sites, which go some way towards offsetting these disadvantages."

Bairagarh, the first to be considered in this group, they felt, was itself excellent because there was enough land for the construction of a factory and township; adequate supply of water was available; the climate was salutary; above all there were good railway connections, giving convenient access to all parts of India. A further advantage was a direct rail connection to Bombay, situated at a distance of 480 miles. This would mean ready accessibility to a port which could be used for importing materials and components.

The site satisfied conditions nos. 1, 2, 6, 7, 8, 9 and 10 adequately. As for condition no. 11, it could be met by developing frequent air services from the existing adjacent airport to Bombay for passenger transport. The deficiency of the site with regard to condition no. 3 could be met by the use of a freight plane service to Calcutta and Bombay for the quick supply of material needed urgently in the factory. Though the communication system was not what would be regarded as ideal, the Consultants were inclined to take an optimistic view of it because Bhopal was to be the capital of the reconstituted State of Madhya Pradesh, and this, they felt, in itself would ensure the development of proper communications within a short period.

The available supply of electrical power in the area, it was pointed out, was not sufficient to meet the requirements of the

factory and township but this deficiency could be overcome by the generation of power within the factory itself. The Government of Madhya Pradesh was also known to be taking steps to increase the supply of power.

Since the site was situated close to the city of Bhopal which had a population of 1,25,000 inhabitants, there would be little difficulty in getting the necessary unskilled labour; this in turn, would minimise the capital expenditure on a new township which would have to be provided for if the site was further removed from the city.

Bhilsa, the Consultants termed as unsatisfactory, mainly because of the low foundation bearing pressures which would have to be used on account of the nature of the ground. Further, the water supply being inadequate considerable expenditure would have to be incurred to ensure the minimum supply of water needed for the factory and township in the dry weather. Again, the site inspected comprised mainly agricultural land which besides being undesirable in itself would pose problems of resettlement and compensation payments. To add to it all, the electrical power supply position was even more acute than at Bhopal. Therefore, the Consultants concluded that the site would only reasonably satisfy conditions nos. 6, 7, 8, 9 and 10.

Antergaon in Hyderabad, the Consultants felt, would provide an excellent situation for the construction of a factory and township. The land was level and suitable for high foundation bearing pressures. In addition, a perennial flow of water supply was assured because the site was situated near the Godavari river.

This site, as the one at Bhopal, was favourably placed in respect of communications and had connections to the ports of Bombay (560 miles), Visakhapatnam (389 miles), and Madras (470 miles). Although there was no airport within 140 miles of the site, it was possible to link it by road with Visakhapatnam, which was situated at a distance of 280 miles.

However, the site suffered from a serious disadvantage in that it was subject to high temperatures ranging over 110°F for more than 100 days of the year. This together with very low wind velocities, it was felt, would affect adversely the efficiency of the workers and thus diminish the output, resulting in increased costs. The nearest towns to this site were Hyderabad

and Nagpur situated at a distance of 140 and 200 miles respectively, thus ruling out easy accessibility to the amenities provided by a town.

The Fourth Group

The Consultants were of the view that the other five sites in Group Four inspected were all the more remote from sources of supply, and had other disadvantages which made it impossible for them to be recommended for the establishment of the H.E.E. factory.

The Consultants, however, felt that *Chinchawad* had certain attractions mainly because of its proximity to Bombay port, which would facilitate quick transportation of imported materials. The site was favourably placed in respect of climate which was found to be healthy and equable. These advantages were, however, overshadowed by the greater disadvantages in respect of the distances over which supplies of raw materials like steel, coal and others would have to be carried and the scarcity of water supply. This would considerably shoot up the cost of production, to say nothing of the capital expenditure that would have to be incurred to ensure an adequate water supply during the dry season. The local roads and rail communications were also not satisfactory. That would also mean extra cost. It was found that a part of the area proposed for the factory and township was under cultivation, and since the area was deficient in food, it would not be desirable to acquire this land. Thus, this site would satisfy conditions nos. 1, 6, 7, 8, 10 and 11 only and that too just reasonably well.

As regards *Visakhapatnam*, the greatest advantage of the site was its proximity to a developing port. However, the Consultants pointed out, this was offset by other disadvantages resulting from distance from the sources of main indigenous supplies. Even though there existed a rail link to the sources of supply, it was one of the most heavily loaded lines in the whole country.

The climate, it was found, was also not very suitable. The average humidity was of the order of 75%. Moreover, being situated on the sea coast there was the further disadvantage of a salty atmosphere, which was bound to result in difficulties with insulation of high voltage equipment being manufactured in the

factory. Further, the provision of a sufficient water supply to the factory and township would, it was estimated, pose a major problem the solution of which would involve high capital expenditure. The conditions fairly satisfactorily fulfilled on this site were nos. 1, 5, 6, 8, 9 and 10.

The only advantages of the site at *Bangalore* appeared to be an equable climate, and a suitable area on which a factory could be constructed. The site was not well placed in respect of supply of raw materials like steel and coal. What was more, there were no adequate railway lines to the site; the line from Bangalore to Madras was also not capable of carrying the additional loading which would be necessary if the factory was to be established at this site. A considerable amount of additional capital expenditure would have to be incurred to solve the problem of transport. Water supply available was also found to be insufficient to meet the needs of the factory and township. The site satisfied conditions nos. 1, 5, 6, 7, 8, 9 and 10 only.

The site at *Avadi* had certain definite advantages in the matter of good port facilities and proper communications from port to the site. However, it was too far removed from sources of supply of steel. Besides, the intervening rail link was known to be heavily loaded. The Consultants estimated that transport costs for incoming materials and manufactured products would be much higher than for sites situated in North India.

Doubts were expressed as to the bearing capacity of the ground, and therefore it was felt that heavy capital expenditure would have to be incurred in preparing the foundation itself.

The water supply in the area being notoriously short, considerable expenditure would have to be incurred to provide sufficient water supply for the factory and township. The site was further subject to high humidity. However, the Consultants thought that conditions nos. 5, 6, 7, 8, 9 and 10 would be reasonably fulfilled on this site.

Kallamassery in Travancore-Cochin State had the great drawback of being far removed from sources of coal, steel and other necessary materials. Besides, the transport charges for incoming and outgoing materials compared most unfavourably with those of other sites.

As there was no suitable level site available in the region, construction costs would be considerable.

The climate being moist would not be suitable for insulation materials used for high voltage equipment. Above all, the area was not free from diseases associated with a wet climate and swampy areas. The Consultants agreed that only conditions nos. 5, 6, 9 and 10 could be reasonably fulfilled on this site.

THE FINAL RECOMMENDATIONS

Having given the fullest thought to all the relevant factors, and after discussing the data with some of their seniormost experts, M/s Main and Beeby, who were specially flown from London to Delhi for the purpose, the Consultants recommended, on February 18, 1956, three sites on which they considered it "practicable to establish the Heavy Electrical Equipment Project with a reasonable chance of early economic success". Of these three, the Consultants reported that "one is of outstanding merit, being in the 'preferred area', and the other two, although quite practicable, are less desirable solely on account of their greater distance from sources of supply of major materials and from major ports, with consequent dependence on long railway links". The Consultants showed a special preference for the site near *Barka Khana* in Bihar, provided that no further steel plants were likely to be set up in the near vicinity. This they recommended as their first choice.

As a second choice, they suggested *Bairagarh* near Bhopal, and as a third choice, in order of merit, *Antergaon* in Hyderabad. The Consultants further added that "the total freight charges for incoming and outgoing materials were not greatly different for any of these three sites, but in the case of *Barka Khana*, the site was within reasonable road transport distance of the major steel supplies and a major port. Bhopal and Antergaon suffer in comparison in this respect and it is probable that more working capital would be required in consequence. This can only be determined accurately by experience, but figures between 10% and 20% are possible. The development of speedier communications such as an air freight service for the factory would minimise this figure..." "Such a development", it was pointed out, "would be immediately possible at Bhopal, where the site is adjacent to an existing airport, but the nearest existing airport to Antergaon is 140 miles away."

In the Consultants' opinion, an important deciding factor, as between Bhopal and Antergaon was the climate. They feared that the high temperatures to which the latter site was subject would act as a depressive and would considerably reduce the capacity of all grades of employees and consequently increase production costs.

In conclusion, the Consultants remarked that in the matter of availability of labour for training or the speed with which the factory could be built and equipped, there was not much to choose among the three sites.

In regard to building cost, the Central Public Works Department had supplied the following cost indices, based on Delhi rates as 100:

Indices of Costs of Works

Hazaribagh (Barka Khana), Bihar	114
Hyderabad	110
Bhopal	103

The freight cost (based on 30,000 tons of manufactured equipment) for the three States was estimated at:

Bihar	Rs. 35,93,000
Bhopal	Rs. 39,58,000
Hyderabad	Rs. 38,13,000

THE RIVAL CLAIMS OF STATES

The Consultants' recommendations were examined by Shri Gadkary, Technical Adviser for the project in the Ministry of Production. Detailed discussions were held with the Consultants during the third and fourth weeks of February 1956. The Consultants explained that they had given adequate consideration to the complex and varied nature of the equipment to be produced and were convinced that the factory should be established in an area where climatic conditions, communications, raw materials and facilities for distribution of the manufactured goods were as favourable as possible.

At about the same time a number of communications were received by the Ministry of Production, from the various States, urging that the proposed heavy electrical equipment factory

should be established in their respective States. These claims, put forward by the Chief Ministers of Bihar, Travancore-Cochin, Hyderabad, U.P. and West Bengal; Secretaries to the Governments of Andhra, Madhya Bharat, Madhya Pradesh and Madras; Members of Parliament from Madras; and citizens of Mysore; were briefly as follows:

The citizens of Mysore urged the location of the heavy electrical equipment factory in their State on the grounds that the State would provide a vast area around the city for the location of the factory, together with adequate quantities of water and power supply. They pointed out that Mysore city was neglected in this respect, as compared to the city of Bangalore where several Government owned factories had come into existence since 1947.

The Government of Madras complained that practically all important industries were concentrated in the North Indian States. It felt it had a special claim for requesting that the heavy electrical equipment factory be situated in Madras because that State was the greatest consumer of heavy electrical equipment. The number of hydro-electric projects in the State was increasing and the plants for all of these had to be imported from abroad. The favourable climatic conditions, adequate transport facilities, and the availability of skilled labour were cited as additional reasons for establishing the H.E.E. factory at Madras.

The Chief Minister of Hyderabad urged that the plant should be located in his State because the natural resources, particularly coal, were ideally suited for the manufacture of heavy electrical equipment. Moreover, it was felt that the Central Government should assist the State in solving its educated unemployment problem; the establishment of the heavy electrical equipment factory would considerably meet the needs of the area in this regard. Finally, as the economic progress of India would depend on the dispersal of industry to promote balanced regional development, the Central Government would do well to establish the factory at Hyderabad.

Andhra expressed the view that, as it was industrially backward, the Centre should show it special consideration and locate the factory within its area. The natural resources of the State, such as a natural harbour at Visakhapatnam, power

supply, ideal climate, good railway connections, cheap labour, central location, adequate water supply and adequate supply of engineering personnel, were mentioned as the factors justifying the location of the heavy electrical equipment factory in Andhra.

The Chief Minister of Travancore-Cochin saw in the location of the factory in his State a possible solution to the problem of chronic unemployment in the State. It was felt that the Central Government should help in the establishment of major industries in the State. The port and rail facilities at Cochin, the availability of suitable site, skilled labour, power supply, good market for the products were some of the grounds put forward for the location of the factory in the State. It was also pointed out that the State had planned for several hydro-electric schemes which would need considerable heavy electrical equipment. This could be produced in the State itself if the proposed H.E.E. factory was established there. In the interests of the diversification of industries also, the Travancore-Cochin State, it was contended, should receive greater preference.

Bihar requested the Union Government to locate the factory in that State in order to provide employment for the displaced persons from East Pakistan. It also mentioned in some detail the natural resources of the Damodar Valley area which would make the location of the factory there highly economical.

Madhya Pradesh urged for the location of the factory within its boundaries on grounds of certain natural advantages enjoyed by the State. It had ideal transport facilities and raw materials were available in plenty. Besides, it was pointed out, the climate was ideal for the establishment of such a plant.

Madhya Bharat complained that there was no heavy or basic industry in the State; and there was no immediate possibility of establishing one either. It was pointed out that facilities such as power supply, water supply, land for the factory and the like would be provided by the State. It was also argued that the salutary climate of the area and the fact that it was not susceptible to earthquake were important factors to be considered in the location of the heavy electricals plant. In these respects the State was second to none.

A number of communications were received from the Chief Minister of Uttar Pradesh, urging that the factory be located in that State. The U.P., it was pointed out, had all the natural resources for the industry: adequate flat land, water supply, efficient cheap labour, coal, transport facilities and power supply. It was also argued that the mounting rate of unemployment in the State could be combated only if the Central Government would help quicken the pace of industrialisation. The Chief Minister of the State further complained that the Uttar Pradesh was not getting its due share in the matter of allocation of projects of industrial development. (He declared in the Uttar Pradesh Cabinet: "U.P. ko koi nahi dekhta.")

Some of these letters were addressed to the Prime Minister, some to the Ministry of Commerce and Industry and the Ministry of Production. The Ministry of Commerce and Industry and the Prime Minister forwarded all the letters addressed to them to the Ministry of Production. The general line of reply given by the Ministry of Production was that a decision on the matter would be taken only after considering the technical Consultants' recommendations as to what would be the most suitable location on the basis of economic and technical considerations. The Minister of Production also indicated that he would place all these letters for the consideration of the Union Cabinet at an appropriate time, when the question of the location of the factory would be considered.

THE DECISION

The technical Consultants submitted their recommendations to the Ministry of Production on February 18, 1956. The Ministry of Production, at a meeting held on February 25, 1956, considered these recommendations and the claims put forward by the various States for the location of the factory within their respective areas. The deliberations at the meeting were also guided by the discussions held earlier by the technical adviser to the Ministry of Production with the technical Consultants. On a consideration of all these factors the Ministry of Production recommended to the Cabinet towards the close of February 1956 that the Heavy Electrical Equipment Plant should be located at Bairagarh near Bhopal.

Reasons for the Decision

The note submitted by the Ministry of Production to the Cabinet gave the reasons for its decision as follows:

The Consultants' recommendations have been examined by our own technical adviser for the project (Shri Gadkary) and have been discussed in detail with them. The Consultants have expressed the view that the close proximity of a steel plant would not be desirable for this project, and in view of the fact that a steel plant is likely to come into existence in the neighbourhood of Barka Khana (which is only 36 miles from Bokaro) and in view also of the Government's policy of achieving dispersal of industrial development over the country, and all other factors, the best location in the circumstances appears to be the Consultants' second recommendation, namely, Bhopal. The Chief Ministers of several States have been writing and requesting that the factory be located in their respective States. Due consideration has been given to all points urged by them.

A meeting of the appropriate committee of the Cabinet was held early in March 1956 to consider the proposal of the Ministry of Production. After discussing the suitability of the various sites visited by the experts, the committee thought the site near Bhopal to be, on the whole, preferable to the others, and desired that the Ministry should find out what facilities in the shape of land and the like could be made available by the State Government for the establishment of the factory and the associated township.

Implementation of the Decision

As soon as the Cabinet approval was given to the scheme, the Government of Bhopal was informed of the decision. The Bhopal Government assured the Government of India of its maximum co-operation and assistance in the construction of the factory and the township; and agreed to extend the following facilities:

1. Arrangements would be made to supply 400 million cubic feet of water annually till the end of the fifth year, and double that quantity subsequently every year.

Even at a liberal estimate, the factory's requirements and those of the township were not expected to exceed this quantity.

2. The water would be supplied to the factory and township at their boundary, and charged for at the actual cost of delivery. No capital cost for storage, pumping, etc. would be charged from the factory.
3. The factory's (and the township's) requirements of electricity were guaranteed at the generation cost, plus overheads permitted by the Indian Electricity Act. In other words, no profit would be made from the factory.
4. The required land, approximately 10 sq. miles for the factory and the township, would be given by the State Government free of cost. It would be made available by the end of June 1956 and the uncultivated portion, which constituted the majority, almost immediately.
5. Two acres of land alongside the lake would be given free for the construction of a hostel for accommodating the foreign technical Consultants and their families, etc.
6. The State Government would effect the necessary diversion of the roads adjoining the factory area to suit the factory and the township.
7. The State Government would improve the link roads from the factory to their junctions on the main Agra-Bombay road and the Saugor-Allahabad-Calcutta road to 'A' standard, within five years. This would substantially meet the requirements of the factory in regard to transportation.
8. The State would assist in the transfer of certain ex-RAF barracks near the factory site, being used as a destitute home by the Ministry of Rehabilitation, to the factory, for use as a training camp and for housing the building teams. That would assist in the speedy construction of the factory and the township.
9. The State Government would also assist in the provision of telephone trunk lines required by the factory and township.
10. The State Government would provide the required amenities outside the factory area, and a school and a hospital at their cost within the factory.

11. The State Government would further appoint a Liaison Officer to ensure speedy implementation of these guarantees.

In short, the State evinced a genuine desire to assist and co-operate with the Government of India in the construction of the factory and the township.

* * *

A provision of Rs. 20 crores was made in the Second Five Year Plan for the project which was tentatively estimated to cost Rs. 30 crores. The factory was scheduled to go into production in 1960 and develop into its full capacity in the course of several years thereafter. It was anticipated that there would be a saving to the extent of Rs. 5 crores per annum in foreign exchange when the factory attained full production. The factory was also expected to provide employment for 10,000 persons including technical and non-technical staff.

The factory would initially manufacture hydraulic turbines, generators, transformers, static capacitors, circuit-breakers, switch-boards, industrial motors, traction equipment, insulating materials, etc. It might take up manufacture of other items of electrical equipment as might be considered necessary later on.

As in the case of similar industrial undertakings under the control of the Ministry of Production, a Private Limited Company known as *Heavy Electrical (Private) Ltd.*, entirely owned by the Central Government, was incorporated to control and manage the factory.

A Nearby New Site is Preferred

The location of H.E.E. project was, however, not without its teething troubles. A closer survey of the site, which had been inspected by the Consultants in parts only, showed that some of its portions were not suitable for the erection of a factory of the type envisaged, because the land beneath the surface was of a soft variety and a great deal of expenditure would have to be incurred to prepare a suitable foundation for the factory. The site originally chosen had therefore to be abandoned. But with the co-operation of the Bhopal Government another suitable site was soon discovered at about a distance of ten miles from the original site.

Of the 4,500 acres of land given for the factory and township it was found that the factory itself would cover only 522 acres. The rest of the area was available for the development of the township and other ancillary uses, with the exception of 360 acres which were found to be unsuitable for development purposes. Action was taken to take over from the State Government another 1,850 acres to complete the total requirements of land.

Rephasing the Execution Plan

During the year 1957, the deterioration in the foreign exchange position necessitated a reappraisal of the development schemes. The Consultants were requested to rephase the H.E.E. scheme in two or more stages, with emphasis on quick return on investment and savings of foreign exchange, without curtailing the capacity of the plant as originally formulated. The Consultants prepared a revised programme to complete the project in three phases. The revised scheme provided that plant Blocks No. I and II would be initially omitted, while three-fourths of the factory Block No. III, the whole of factory Block No. IV, half of the Foundry Block and the whole of the Maintenance Block would be constructed.

An integrated scheme for the training of personnel for the project was formulated in consultation with the Consultants. Suitable personnel were recruited for specialised training in the factories of the Consultants in the U.K. A training school was also set up at Bhopal to train the various categories of junior personnel, e.g., artisans and others required to man the factory. The training school started functioning in June 1958.

By 1959 the work of levelling was completed. However, it was found that soil on the plot where Block IV was to be erected was black cotton soil extending up to 12'-15' below the ground. It was therefore decided to remove this soil and to fill it with stone boulders and murum, to provide solid foundation for the factory.

Towards the end of 1959 a review of the actual imports of heavy electrical equipment during the last few years was undertaken together with a reappraisal of the additional electric power generation capacity to be provided in the Third and Fourth Five Year Plans. On the basis of this assessment the Government of India emphasised the urgency of early implementation

of phases II and III of the factory at Bhopal. Project authorities were also asked to draw up a revised project estimate for an overall annual output of Rs. 25 crores.

The Central Water and Power Commission after a detailed assessment of the needs of the country of heavy electrical equipment came to the conclusion that during the Fourth Five Year Plan the demand would be of the order of Rs. 80 crores per annum. The Government therefore proposed the expansion of the factory for an output of Rs. 50 crores.

Electricity supply was obtained from Itarsi Power House. There were occasional failures of electric supply but arrangements were made to get electricity from Chambal Receiving Station at Bhopal. Furthermore, as a precaution against failure of electricity in future, a thermal power plant on the site itself with a 3,000 KW Turbo Alternator was installed.

In November 1960 the Prime Minister formally inaugurated the factory and the work has been progressing satisfactorily since.

COMMENTS

THE long and tame Case narrative which precedes may have placed a great strain on the interest and patience of the readers. For correct appreciation of the decisions the Case deals with, it seems essential to bear in mind the economic and political climate which surrounded them. The original proposal for the establishment of a heavy electrical equipment factory was made a year before and was considered soon after the Independence.

The proposals of 1948-50 were the result of a new awakening within the Government of India about its responsibilities for making the country self-sufficient in basic industries. The Industrial Policy Resolution of 1948 marked a further advance in the evolution of the industrial policy of the Government as enunciated in the Industrial Policy Statement of 1945. All the same, the basic issues had still not crystallised and the goal of industrialisation was foggy, though the need for it was fully realised.

Though it was recognised that a heavy electrical equipment project was vital to attaining self-sufficiency in the basic industries, consideration of finance resulted in almost scrapping the project in 1950. Those were the years when there was a heavy drain on foreign exchange earnings. Sindri, Hindustan Shipyard and several other major projects were under way and funds had to be diverted to these schemes which had been already approved. Moreover, food was a grievous problem of the time and this in turn accentuated the financial scarcity.

It would therefore appear that throughout the Case the importance of the foreign exchange, the political situation, external defence and several other considerations should have been dealt with in their entirety to make a complete story. The delineation of the foreign exchange situation alone would have constituted an important part of the Case narrative up to the point the Consultants were appointed. However, these factors have not been mentioned in any detail mainly because that would have given a misleading impression, considering that they actually were not very much taken into account except in 1950 when the project was deferred due to financial stringency.

Though the necessity of the setting up a heavy electrical equipment plant was recognised as early as 1948, a final decision in this regard was taken only eight years later, in 1956. It was estimated in 1948 that the establishment of the H.E.E. project would result in foreign exchange savings to the tune of Rs. 5 crores annually. With the inauguration of the First Five Year Plan, the number of hydro-electric schemes in the country multiplied and the demand for heavy electrical equipment increased considerably. Had the decision been taken in 1948, more than Rs. 45 crores in foreign exchange could have been saved.

A part of the delay in the realisation of this objective was caused by the controversy between the Ministries of Production and Commerce and Industry whether the plant should be set up in the public sector or the private sector. The Ministry of Commerce and Industry was interested to locate it in the private sector, while the newly established Ministry of Production was eager to expand the sphere of governmental operations in the industrial field. Under the Industrial Policy Resolution of 1948, the manufacture of heavy electrical equipment fell in the category of private enterprises subject to Government regulation and control. Considered in this context and in face of the different responsibilities allocated to them, the differences between the points of view of the Ministries of Production and Commerce and Industry appear to spring from the impersonal nature of the decision-making processes in the Government. When the Government decided in 1954 to set up a state factory, the focus of controversy was shifted to the items scheduled to be produced in the factory. In this regard too the Ministry of Production and the Ministry of Commerce and Industry could not see eye to eye.

The procedural delays involved in taking the decision will be better appreciated if it is remembered that when the matter was being considered Government was a new entrant in the field of industrial development. Thus, there was a natural reluctance on the part of the Government to set up a state heavy electrical equipment factory lest it should be encroaching on the hitherto undisputed domain of the private sector.

Despite the delay in taking a decision on this question, Parliament's interest was limited to seeking information, and even the short discussion on Demand for Grants of the Ministry of

Production did not create a sensational debate in the House. The case for the early establishment of the H.E.E. project seems to have gone by default, mainly because this was one of the several projects that were being considered at that time and the House seems to have been satisfied with the answers provided by the Minister of Production.

II

The nature and newness of the enterprise as well as the commitments it involved called for a type of consultancy somewhat different from the normal consultancy services needed for the setting up of an industrial establishment. This factor indeed narrowed the choice of consultants to a few; and in the A.E.I. there was found the appropriate party, with vast experience and resources and a progressive outlook, for providing consultancy services and advice. The consultancy agreement provided that the A.E.I. would survey the possibilities and examine the different alternative sites for the location of the factory. It was to act as technical consultants to help and advise in the establishment of an efficient factory as expeditiously and economically as possible. Besides, the consultants were also to recommend whether one or more factories should be established to cover the manufacturing programme.

Once it was decided to establish the H.E.E. factory in the public sector, things seem to have proceeded at a quick pace. In November 1955 an agreement was signed with the Consultants. They made a quick survey of the sites within a short period of eight weeks and submitted their recommendations to the Government. The Government decided in the first week of March 1956 to locate the factory at Bhopal.

The decision was taken within three months and eight days of the appointment of the Consultants. Though the Government gave full scope to the different State Governments to put forward their claims for the location of the factory in their areas, ultimately a decision was taken purely on technical and economic grounds. The sites finally considered by the Government were only those that had been suggested by the Consultants on the basis of climatic conditions, availability of raw materials and accessibility to sea or airports, taking into consideration the

special needs of the H.E.E. project. Political considerations seem to have played little part in the decision to locate the factory at Bhopal, in spite of the attempts made by influential leaders of certain States. It was realised that the H.E.E. factory which was to be the biggest of its kind in South-East Asia and which would help to broaden the base for further industrialisation should be located primarily on economic grounds.

Though the Consultants had given the first preference to the site in Bihar which satisfied all the technical considerations, the Government decided to locate the factory at Bhopal, the second choice of the Consultants. In this the Government was influenced by such considerations as regional development and diversification of heavy industries to achieve a balanced development of the country, since a steel plant was scheduled to be set up in Bihar.

The technical Consultants' third choice, Hyderabad, had a greater claim on economic grounds for the location of the heavy electrical equipment factory in that State, because the project would have helped solve the acute unemployment problem confronting the State at that time. However, the comparatively moderate climate of Bhopal, together with the fact that transport facilities by air were better at Bhopal than at Hyderabad, turned the decision in favour of Bhopal.

III

The Case Study highlights several aspects of the process of decision-making in the Government of India. It brings out the highly impersonal nature of this process and the lack of any concentrated motive or bias on the part of the civil servants. It shows how all the three decisions were taken mainly on economic and technical considerations, though pressures, both political and economic, attempted to influence these decisions. The impersonal process of decision-making, however, has as its corollary the inadequacy of programme orientation on the part of civil servants. The civil servants are responsible for results to the Executive and through it to the people and their representatives in Parliament.

The Case indicates the checks and cross-checks that exist

within Government to avoid pitfalls in decision-making. It illumines the roles, attitudes and relationships of the generalists and the specialists and the administrative Ministries having seemingly conflicting responsibilities. It also throws light on the efficacy of formal methods of administrative consultation and co-ordination, in particular the committee system for facilitating speedy decisions. The system of *ad hoc* consultative committees seems to have worked well in tapping expert advice from different sources but in no way does it appear to have speeded up very much the process of decision-making.

It seems necessary to add that while the Case Study illumines these administrative concepts and issues, it does so within the limitations imposed by the Case. For instance, the Study illustrates the process of preparation and assessment of material by the civil servants for a final decision to be taken by the Cabinet but it does not purport to determine the relative influence of the civil servants and the Ministers on decision-making. Similarly, though the Case Study depicts the part played by the committee system in decision-making on important issues, it is by no means implied that speedier methods of consultation were not adopted. Quite often important points were cleared through telephonic conversations every word of which was recorded on files for further reference. None the less, every important decision was taken only at committee meetings. Again, while the Study brings out the advisory role of the specialists in helping the generalists to arrive at decisions, it makes no claims to weigh their relative impact on the final decision.

APPENDIX I

(referred to at p. 21)

SUMMARY OF TERMS & CONDITIONS OFFERED BY FOREIGN FIRMS IN 1949

<i>Heads of questionnaire</i>	<i>Firm B</i>	<i>A.E.I.</i>
1. Items of manufacturing programme on which collaboration offered.	All items with subsidiary collaboration for (a) Hydraulic turbines, and (b) Current and potential transformers. Insulation materials will require separate arrangements.	All items with subsidiary collaboration for (a) Hydraulic turbines, and (b) Static capacitors Insulation materials will require separate arrangements.
2. Factories established abroad.	Licence contract. in numerous countries.	Factories established in many countries including the U.S.S.R. Also manufacture under A.E.I. licences.
3. Terms and conditions.	<p>A. Technical Manager and Assistant Commercial Manager of factory to be nominated by Firm B.</p> <p>B. Lump sum payment—4.5% on capital investment for the factory. On Firm B's estimate of capital investment, Rs. 10 crores, the amount will be Rs. 45 lakhs. Terms cover only one factory.</p> <p>(i) Offers for equipment of confidential design developed by Firm B to be obtained from Firms elected in agreement with Firm B.</p>	<p>A. No such stipulation as made by Firm B.</p> <p>B. Lump sum payment—£350,000 (Rs. 46½ lakhs) On A.E.I.'s estimate of capital investment, namely, Rs. 15.9 crores, this will be nearly 3%. No change in terms even if more than one factory is to be established.</p> <p>(i) design drawings and purchasing specifications for those special items of equipment for which such drawings, etc. are essential—3% of value of equipment. (Work will be very limited in volume—total will not exceed Rs. 12 lakhs.)</p>

Heads of questionnaire	Firm B	A.E.I.
3. Terms and conditions. (Contd.)		
(ii)	-do-	(ii) For equipment for which A.E.I. is required by Govt. to act as its purchasing agents—5% of value of equipment. (Will include (i) above.)
(iii)	Inspection of plant and machinery during manufacture, etc. outside its country—Cost plus overheads.	(iii) Inspection of plant and machinery (not ordered by A.E.I.) during manufacture etc. will be charged at cost plus overheads.
C. Service charge :	C. Service charge :	C. Service charge :
(i)	(i) Lump sum payments (licence fees for the manufacture of different products)—Rs. 29.12 lakhs	(i) Lump sum payment—Nil.
(ii) (a)	(a) Service charge on the sales* value of the different products <i>excepting</i> hydraulic turbines—3-7% (average 4.5%)	(ii) (a) Service charge on the sales* value of the different products <i>excepting</i> hydraulic turbines—2½%
(b)	(b) Service charge for hydraulic* turbines—6.7% (subsidiary collaboration)	(b) Service charge for hydraulic* turbines—£75,000 per year for 2 years and later 5%. (Subsidiary collaboration)
(iii)	Designs of individual hydraulic turbines—extra. Payments <i>free</i> of Indian income tax.	No charge for designs of individual hydraulic turbines. (iii) Payments in rupees, subject to Indian income tax.
(iv)	Period of Agreement: 20 years if the output of factory is Rs. 7.5 crores or more in the 10th year, and 25 years if the output is less than Rs. 7.5 crores in the 10th year.	(iv) Period of Agreement—51 years.

*Value of imported components is excluded in all cases.

D. Experts :

Salaries and overheads, travelling expenses, etc. for experts—extra.

During the period of de-tailed project report only allowances and expenses will be charged and *not* salaries.

E. Charge for training of personnel in Firm B's Workshops

(i) Cost of interpreters, insurance and educational institutes plus (ii) cost of training is DM. 5 per person per day.

F. Financial participation :

Loan equal to value of orders placed on Firm B for electrical equipment for the factory but not more than 20% of the total cost of plant and machinery which is estimated at Rs. 7.5 crores.

D. Experts :

Salaries and overheads, travelling expenses, etc. for experts—extra.

During period of preparation of de-tailed project reports A.E.I. will make no charge for the experts either for salaries or allowances.

E. Charge for training of personnel in A.E.I. Works:

No charge.

F. Financial participation :

Loan of:

(i) £300,000 out of lump sum Consultants' fee of £350,000 at £60,000 per annum for 5 years as instalments fall due to A.E.I.

(ii) 10% of payments against orders placed in India for products of A.E.I.'s U.K. factories within the range of State factory for a period of 10 years (present sales value about £1 million, expected to increase to £2 millions per annum)

(a) Interest:

3½% subject to Indian income tax.

(a) Interest:

for the first four years—nil
from the 5th year for 3 years—3%
from the 8th year onwards—6%*
(free of Indian income tax)

Heads of questionnaire	Firm B	A.E.I.
3. Terms and conditions. (Contd.)	<p>(b) Period of loan—15/20 years.</p> <p>(c) Capital to be repatriated at "at least" face value in their money free of Indian income tax.</p> <p>(d) Firm B should have representation on the Board of Directors and should be consulted about share capital, bye-laws, and management of the company.</p>	<p>(b) Period of the loans—15 years.</p> <p>(c) Item (i) repayable in sterling & item (ii) in rupees, with interest on both items in rupees. Interest also may be paid at end of 15 years.</p> <p>(d) No question of representation on the Board has been raised.</p>
4. Time Schedule of Development.	Full production—End of 12 years from selection of factory site.	Full production—12 years from date of receipt of complete instructions to proceed with the project.
5. Estimate of Capital investment.	<p>Factory buildings and electrical plant (without land) Lakhs of Rs. 300</p> <p>Machine tools, equipment, etc. 700</p>	<p>Factory buildings offices Lakhs of Rs. 560</p> <p>including services (without land)</p> <p>Machine tools and equipment services, plant and miscellaneous equipment 1030</p>
6. Estimate of personnel requirements.	<p>TOTAL Rs. 10 crores</p> <p>Working Capital Rs. 5.5 crores</p> <p>Estimated output Rs. 10 crores</p> <p>Final Stage</p> <p>(a) Wage earners 4,600</p> <p>(b) Salaried employees 1,900</p> <p>6,500</p>	<p>Rs. 15.9 crores</p> <p>Working capital Rs. 8 crores</p> <p>Estimated output Rs. 14 crores</p> <p>Final Stage</p> <p>(a) Wage earners 10,750</p> <p>(b) Salaried employees 1,450</p> <p>12,200</p>
(Exclusive of personnel under training.)		

CHRONOLOGY OF MAIN EVENTS

Decision One : The Choice of the Public Sector

1947

February The Advisory Planning Board recommends the development of the heavy electrical machinery industry under central planning.

December The Technical Committee on Engineering Industries of the Industries Conference proposes the establishment of a heavy electrical equipment plant in India.

1948

March An Exploratory Committee is set up to examine the possibilities of establishing a heavy electrical equipment factory. The Exploratory Committee recommends that the H.E.E. plant should be set up in the public sector.

1949

January Foreign firms are invited to prepare project reports.

December Foreign firms submit project reports.
The Exploratory Committee recommends the manufacture of power plant of 175,000 KW a year to begin with, reaching 300,000 KW at peak production, involving a total outlay of Rs. 22 crores.

1950

Proposal is deferred due to financial stringency.

* * *

1952

August The proposal is revived by the Ministry of Production.

December The Planning Commission agrees to earmark a sum of Rs. 7 crores in the First Five Year Plan for the preliminary expenses of the project.

1953

January It is decided at an inter-Ministry meeting to

invite foreign firms for technical and financial collaboration.

The Union Cabinet considers the proposal of the Ministry of Production for the inclusion of the project in the budget of the Ministry for the year 1953-54 but defers action to consider the views of the Ministry of Commerce and Industry.

The Ministry of Commerce and Industry presses the claims of private manufacturers and asks for an assessment of the likely demand after five years.

April At an inter-Ministry meeting it is resolved that the future requirements amply justify the establishment of a H.E.E. factory, and that reputed foreign firms, willing to collaborate financially also, should be invited to prepare project reports.

May Firms of international repute are invited to submit project reports.

July The Power Plant Industry presents its case. The Indian Electrical Manufacturers Association draws attention to the statement made by the Minister of Commerce and Industry in December 1952 that the Government would assist the private industry in manufacturing heavy electrical equipment, and further requests that in planning the H.E.E. project the existing and potential capacity of the private sector should be given full consideration.

September The project is included in the budget of the Ministry of Production for the year 1953-54.

December The Minister of Production assures that the claims of the private sector will be taken into consideration in deciding upon the H.E.E. Project.

1954

April A review of the capacity of the Electrical Industry in India is conducted by the Industrial Adviser to Ministry of Commerce & Industry.

- July A similar review is undertaken by a Member of the Central Water and Power Commission.
- August A joint report is submitted by the two experts—the Industrial Adviser to the Ministry of Commerce and Industry, and Member, Central Water and Power Commission.
Discussions are held with the Electrical Equipment Manufacturers.
The question is reviewed at an inter-Ministry meeting and a compromise solution acceptable both to the Ministry of Commerce and Industry and the Ministry of Production is found.
- September The proposal for the manufacture of heavy electrical equipment in a factory to be taken over by the State is submitted to the Union Cabinet which decides that before any final decision is taken, certain aspects of the project should be investigated by an expert committee.
- October A H.E.E. Committee is appointed to study and report on requirements of the country in respect of heavy electrical equipment vis-a-vis the current and potential capacity of the existing public and private undertakings and to make recommendations regarding the manufacture of the residue of requirements.
- 1955**
- January The H.E.E. Committee submits its report,—recommends the establishment of a state factory without further delay and indicates the items to be produced in the factory.
- February The recommendations of the H.E.E. Committee are accepted by the Ministry of Production with minor modifications regarding the items of production.
- March The Cabinet approves of the proposal put forward by the Ministry of Production, and suggests the appointment of an Electrical Experts Committee to advise on the appointment of consultants, etc.

*Decision Two: Selection of Consultants***1955**

- June An Electrical Experts Committee is appointed to examine the project reports and terms of collaboration offered by foreign firms.
- July The Negotiating Committee recommends the appointment of the Associated Electrical Industries of the U.K. as Consultants to Government for the H.E.E. project.
- September The Government of India approves the appointment of the Associated Electrical Industries as Consultants.
- November An agreement is signed with the Associated Electrical Industries.

*Decision Three: Siting and Location***1955**

- November A questionnaire is circulated to the States for suggestions regarding suitable sites for the location of H.E.E. factory.
- December Inspection tour of the 14 sites by the A.E.I. and Indian experts.

1956 February

- February Recommendations are made by the A.E.I. regarding the number of factories to be set up and the best three sites for the location of the H.E.E. factory (i. e., Barka Khana in Bihar, Bairagarh near Bhopal, and Antergaon in Hyderabad).

After considering the rival claims of different States, the Ministry of Production recommends to the Union Cabinet that the heavy electrical equipment factory be located at Bairagarh near Bhopal.

- March The Union Cabinet approves of the proposal.